BEST PRACTICES IN FREIGHT PLANNING

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16. Abstract

Freight planning is now a required part of transportation planning. State departments of transportation and metropolitan planning organizations are all struggling with how to include meaningful freight information in their transportation plans. In many cases, their efforts are frustrated by the lack of critical information on freight movements, the lack of control over major freight modes, or the lack of a model for how good freight planning should be done. This effort, which was sponsored by the Center for Freight and Infrastructure Research and Education (CFIRE) and the Mississippi Valley Freight Coalition (MVFC), is an attempt to provide some framework and ideas on how to begin freight planning.

This guide was prepared after reviewing many state and MPO plans and after talking with many people who were involved in those plans. The ideas contained within are largely those of planners who have had some success in doing freight work. In some cases they draw on other research efforts. In still others, they are the product of the researchers' efforts to synthesize from a range of experiences.

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Table of Contents

Executive Summary

This guide to best practices in freight planning offers information on the experiences of state departments of transportation and metropolitan planning organizations from across the country. It is intended to raise questions and offer ideas and alternatives. It is not a “cookbook” on how to do freight planning. The circumstances of specific agencies are sufficiently unique that no single approach will address the needs of many organizations. The scope of metropolitan planning organizations, for example, range from populations measured in the tens of millions to those in the range of tens of thousands; from those with complex and varied industrial development to those with fairly limited industrial activity; and from those with multiple transportation centers and intermodal hubs to those with one or two significant corridors. The range is equally great for states.

The guide begins by noting the number of approaches that have been used and referred to as freight planning and asks the question: Why are you doing a freight plan or element? A considered answer to this will lead the would-be freight planner to specific options, some simple and some complex. It then asks how this plan or planning element fits with other planning or non-planning activities if the agency. A good answer o this will aid in providing clarity to all who are involved in the planning process.

Next the guide moves to the major activities involved in doing a plan. Under the heading of industry involvement, the usual problems of getting the private sector to take an active role are noted. The various states’ use of advisory committees is discussed and finally a four-step process for gaining industry trust and support is introduced. The simple message is that getting involvement is more difficult than issuing invitations to take part in a committee. Much work has to be done to gain the trust of the industry and to establish the credibility of your efforts.

Public involvement is discussed in terms of the tools used to gain that involvement, surveys, meetings, advisory groups and workgroups and web tools. The experience of agencies in finding new twists to each of the tools is discussed to provide ideas for the use of these tools that might be innovative.

The efforts of many agencies to address multi-modal issues in plans are reviewed. Typically, those efforts have been more descriptive than policy based. Some of the reasons for this shortfall are discussed and suggestions are made to make improvement.

Performance measures are discussed in terms of how they might be used to make a plan more tangible. The experience of leaders in the area is reviewed and some suggestions made on which measures might be most useful and most easily employed.

Implementation is given significant discussion in an effort to make plans for useful and used. specifically the experience of MNDOT is used as a suggestion as to how the plans might be incorporated into the ongoing activities of the agency and thus made a part of normal business.

The data needs are discussed along with data sources and tools. The strengths of specific data sources are discussed as well as data systems and modeling tools. The content and limitations of data sources on domestic freight flows, the commodity flow survey (CFS), the freight analysis framework (FAF) and Transearch , are reviewed. Similarly, the utility of various information sources on international trade is evaluated. Finally, a number of mode-specific sources are discussed.

Last the tools that can be used to pull all of this information together are evaluated. Beginning with fairly basic tools, such as a growth factor approach or the four-step model, the discussion moves to more sophisticated tools, such as advanced urban models. Like the balance of the guide, the intent is not to offer a specific solution or recommendation, but rather to illustrate the range of possibilities that exist and to portray the experiences of others as they have progressed along that same path.

Best Practices in Freight Planning
CFIRE 2008

Introduction

Freight planning is now a required part of transportation planning. State departments of transportation and metropolitan planning organizations are all struggling with how to include meaningful freight information in their transportation plans. In many cases, their efforts are frustrated by the lack of critical information on freight movements, the lack of control over major freight modes, or the lack of a model for how good freight planning should be done. This effort, which was sponsored by the Center for Freight and Infrastructure Research and Education (CFIRE) and the Mississippi Valley Freight Coalition (MVFC), is an attempt to provide some framework and ideas on how to begin freight planning.

This guide was prepared after reviewing many state and MPO plans and after talking with many people who were involved in those plans. The ideas contained within are largely those of planners who have had some success in doing freight work. In some cases they draw on other research efforts. In still others, they are the product of the researchers' efforts to synthesize from a range of experiences.

Getting Started

The needs, resources, and circumstances of transportation and planning agencies differ widely. Therefore, a first step in the planning process should be to take stock of the agency and the environment within which it operates. As ***Figure 1*** suggests, the success of the planning efforts will largely depend on how well it satisfies the agency's needs.

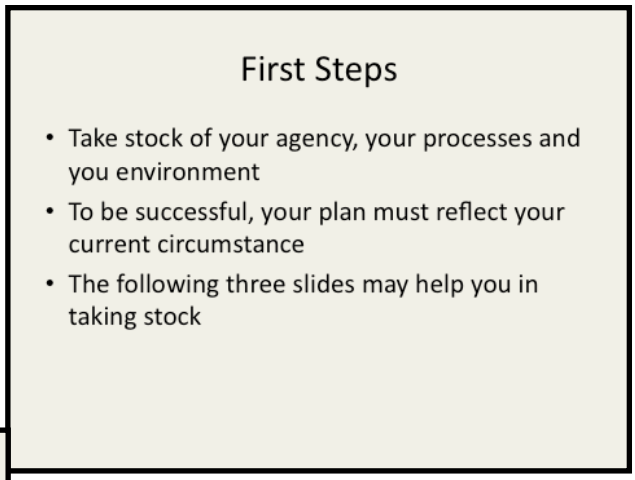


Figure 1: First Step

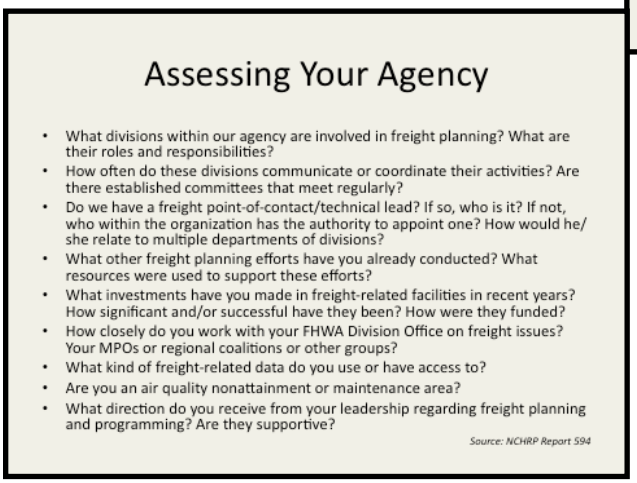


Figure 2: Assessing Your Agency

The NCHRP Guide Book on Freight Planning (Report 594) offers three lists of questions that are helpful for anyone beginning the planning process. One deals with the agency, ***Figure 2***. The second deals with processes, ***Figure 3*** and, the third deals with stakeholders, ***Figure 4***.

Assessing your agency, ***Figure 2,*** deals in part with determining who within the agency has a role in the freight and/or freight planning process. This is critical since many state agencies have responsibility for activities related to freight spread throughout many bureaus and divisions. Ensuring that all with a role play that role, communicate with others and communicate consistently and productively with other agencies and the private sector is critical.

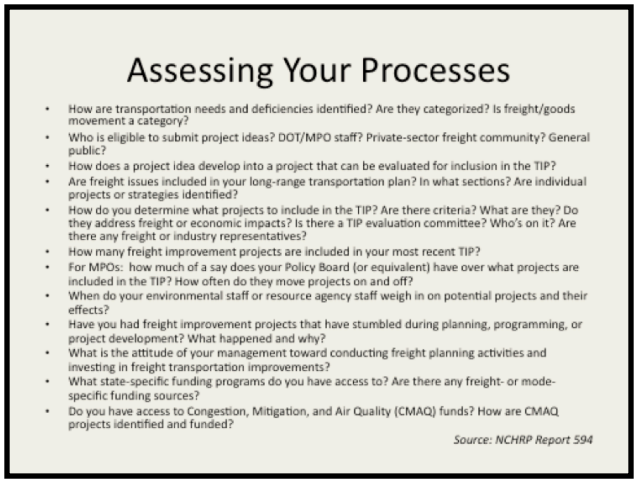


Figure 3: Assessing Your Processes

The discussion of processes, ***Figure 3,*** is equally important. Projects related to freight are often outside of the norm of projects considered in a plan or program. They may have different constituencies. They may deal with different modes. They may qualify for different funding sources. They may also require attention to unusual details in the development process. Therefore, issues such as how needs are defined are important for the planner to consider. Similarly, how projects are brought forward to the planning and programming process; Whether freight-specific criteria are used in evaluating candidate projects; Whether policy decision makers have an understanding of and support for projects related to freight; and, What your agency's track record is in dealing with freight are also important.

The answers will help the freight planner better understand the challenges and opportunities that might be available within the processes used by the agency.

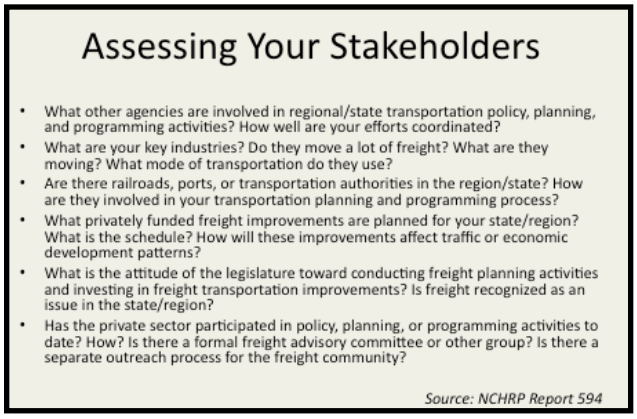


Figure 4: Assessing Your Stakeholders

Finally, stakeholders, ***Figure 4,*** should also be evaluated. Often several state or regional agencies have some role in dealing with freight—departments of transportation, metropolitan planning organizations, commerce departments, state police, state motor vehicle agencies, state revenue agencies, state rail agencies, and state and local port authorities. Understanding the role of each of these organizations and coordinating their participation can be important to the success of the effort.

In the legislative arena, the degree of understanding and support among key committees can also be significant. If those participants are not supportive or brought into the process, plan recommendations may well fall on the deaf ears of decision makers.

The private sector is also important. They have a unique understanding of the freight movement issues. They are the natural supporters of efforts to improve the freight transportation system. They will also probably be the source of revenue, either through state tax policy or through private investment, for improvements to the system. Therefore, they must also be brought into the planning process.

After assessing your agency, its process, and your stakeholders, it's appropriate to spend some time planning for your plan. Some of the key issues that your thought process should consider are listed in ***Figure 5***.

The plan to be developed should address the needs of the agency and its stakeholders. This can be done because freight plans vary widely among agencies. The type of plan chosen should be suited to the agency.

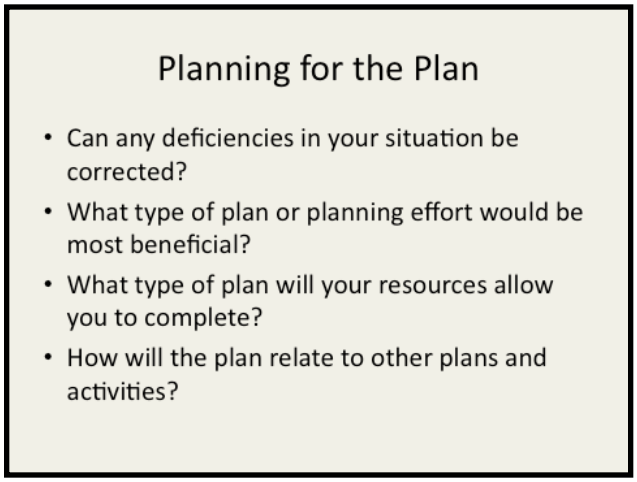


Figure 5: Planning for the Plan

Types of Plans and Their Strengths

Freight plans run the range from purely descriptive to precise dictates for action. ***Figure 6*** provides a listing of types and suggests a hierarchy; a hierarchy only in the sense that it is difficult to carry out higher level plan types if the work and the thought process of the more basic levels has not been done. A system plan cannot be completed, if an adequate description of the industry and its uses of the system has not been assembled.

Figures 7–11 lists the characteristics of each type of plan.

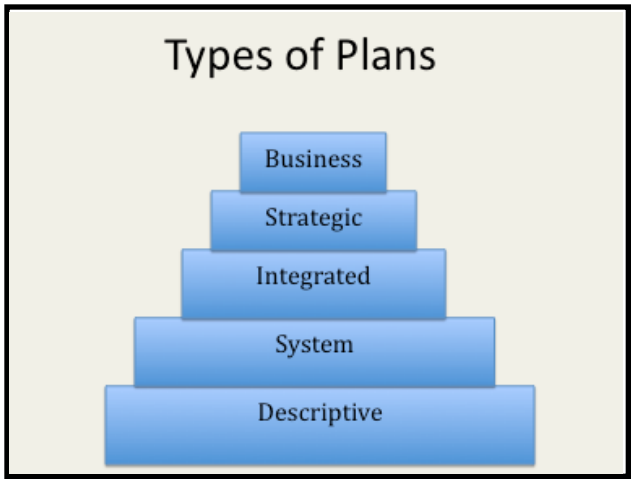


Figure 6: Types of Plans

A descriptive plan, ***Figure 7,*** provides a sound summary of the freight industry in the state or region and the uses that that industry makes of the transportation system. It should also contain a description of the importance of freight for the economy, contribution of gross state product, jobs created and freight-dependent industries. It can be an expensive plan with purchased data and consultant furnished analysis of that data, or it can be a less expensive effort using readily available published data from local, state, and federal sources. The states of New York and Oregon have each produced documents that are fairly complete descriptive plans based on published data. (A Transportation Profile of the State of New York at https://www.nysdot.gov/portal/page/portal/main/transportation-plan/repository/sp2000051104.pdf and Oregon Transportation Plan Update: Freight Issues at http://www.oregon.gov/ODOT/TD/TP/docs/otpPubs/FreightIssues.pdf) In both these cases, the documents were preliminary products in support of a larger planning process, but each develops the freight topic quite well.

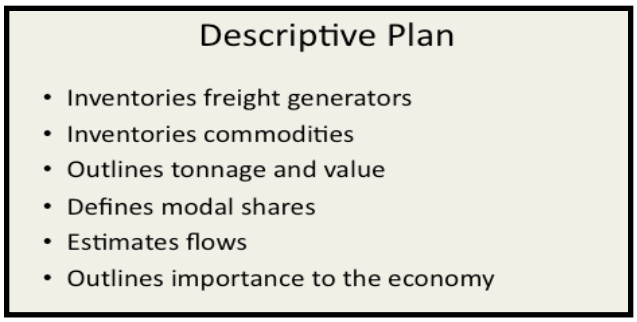


Figure 7: A Descriptive Plan

A system plan, ***Figure 8,*** is a more traditional transportation plan. It defines current conditions and usage, estimates future demands, defines gaps, and proposes solutions.

An integrated plan, ***Figure 9,*** combines a systems plan related to freight into a more comprehensive planning document. In this case, freight would be one element of a plan that dealt with passenger and other transportation issues.

Figure 10 defines a strategic plan. This type of plan deals with issues beyond infrastructure. It provides broad, but clear direction for agency actions and positions.

The North Dakota TransAction II is an example of a strategic planning approach. It proposes goals and strategies for attaining those goals in a wide range of areas.

The final plan type that we discuss is the business plan. As outlined in ***Figure 11***, it shares many features with a strategic plan, but typically it would cover a wider range of business or operational issues and it provides specific direction to parts of the agency for specific actions to implement the direction of the agency. Ohio's 2008–2009 Business Plan is an example.

As was pointed out at the start of this section, these plan types are not totally independent. All should be based on a sound analysis of the existing conditions, future needs, and goals. It is, however, useful to think about the approach that best suits your agency. It is also useful to think about how the total effort might be staged: some of the types discussed might be preliminary products in support of a larger effort.

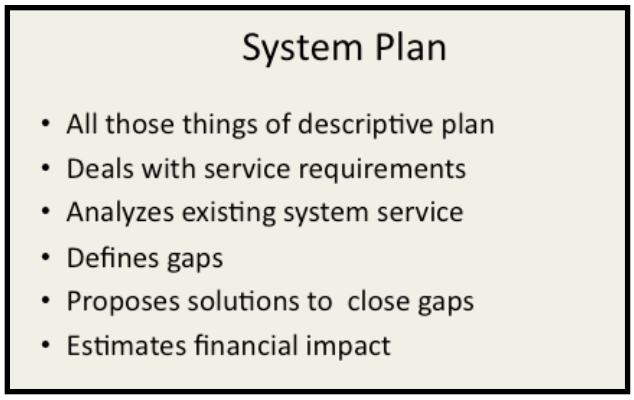


Figure 8: A System Plan

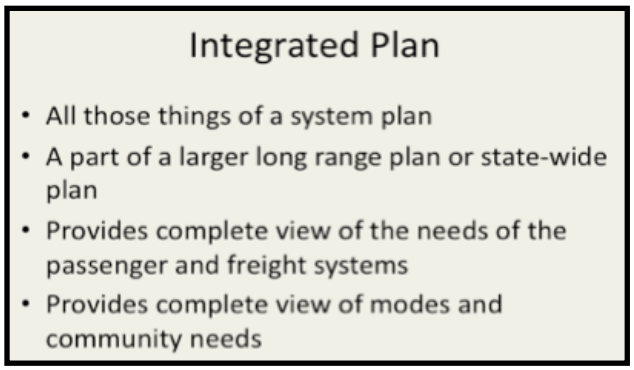


Figure 9: An Integrated Plan

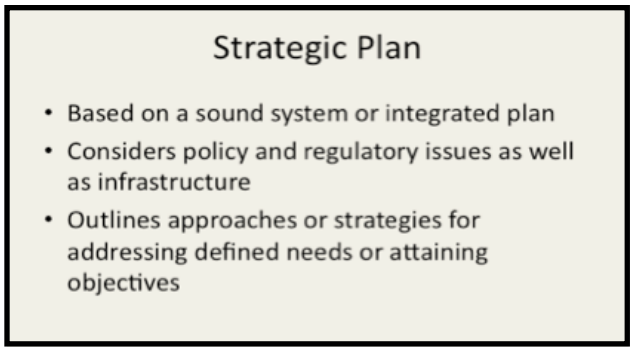


Figure 10: A Strategic Plan

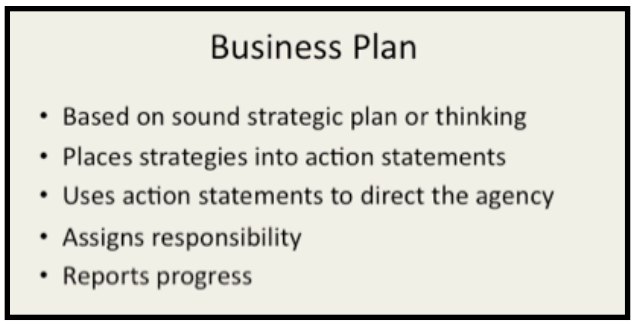


Figure 11: A Business Plan

Why do a Plan?

Agencies are now preparing freight plans with many motivations, ***Figure 12***. Some are doing so because the federal rules now require it; others because they feel a need to educate decision makers or the public on freight issues; some want to facilitate a policy discussion of freight issues; some want to influence how resources are allocated; and some want to do all the above.

Figure 12: Why do Plans?

Not all plan types are equally suited to all needs. ***Figure 13*** illustrates how types and purposes can be matched. The darker green cells indicate the strongest matches And the lighter green indicates a less strong match. For example, if your goal is compliance, any of the plan types will work, but if that is the only goal, why go to the effort of anything more than a description of the current freight situation? Similarly, educational objectives can be met with any of the plan types, but a solid description of the current freight situation, including a discussion of freight-dependent industries, jobs created and overall economic contribution will probably do the job best. An integrated plan will probably do the best job of raising policy issues since it will present a better picture of the transportation system. Resource allocation decisions are most likely to be influenced by strategic or business plans since those types tend to be most closely tied to the internal decision making processes of the agency.

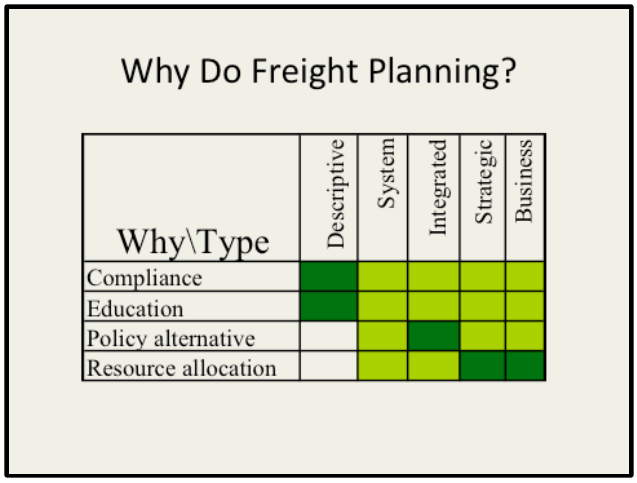


Figure 13: Why Do Planning?

Where Does the Plan Fit?

Few plans are completely stand alone documents. Long range plans should feed TIPS and STIPS. Statewide plans should influence or integrate regional plans. Modal plans might feed into multi-modal plans. System plans should inform strategic plans. Giving thought to all of these potential connections at the start may help to make more sense of the total planning process. Washington did such a definition in their seven planning steps, ***Figure 14***.

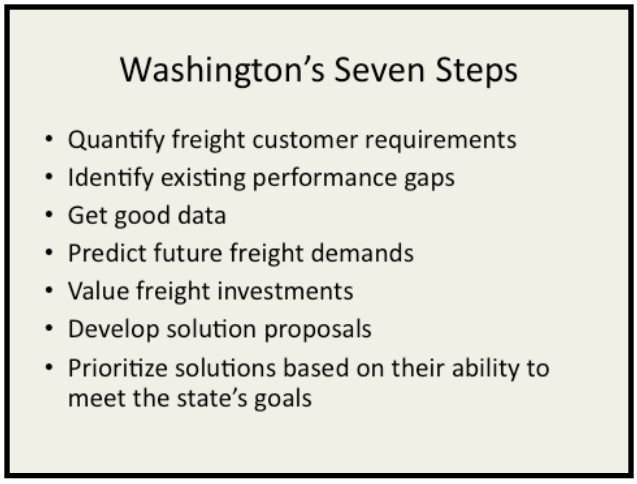


Figure 14: Washington's Seven Steps

Other approaches have been used in other studies and states. ***Figure 15*** illustrates a fairly standard approach to planning, programming, and program implementation as used in NCHRP 112. It outlines an interacting parallel process between the state agency and the MPO, which leads directly to programming and implementation.

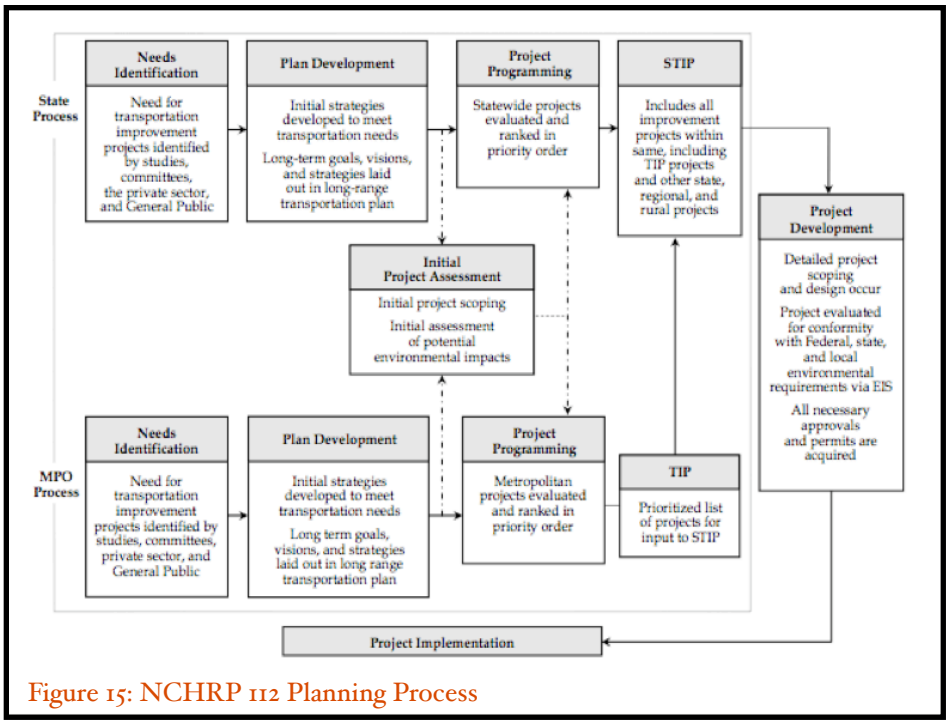


Figure 15: NCHRP 112 Planning Process

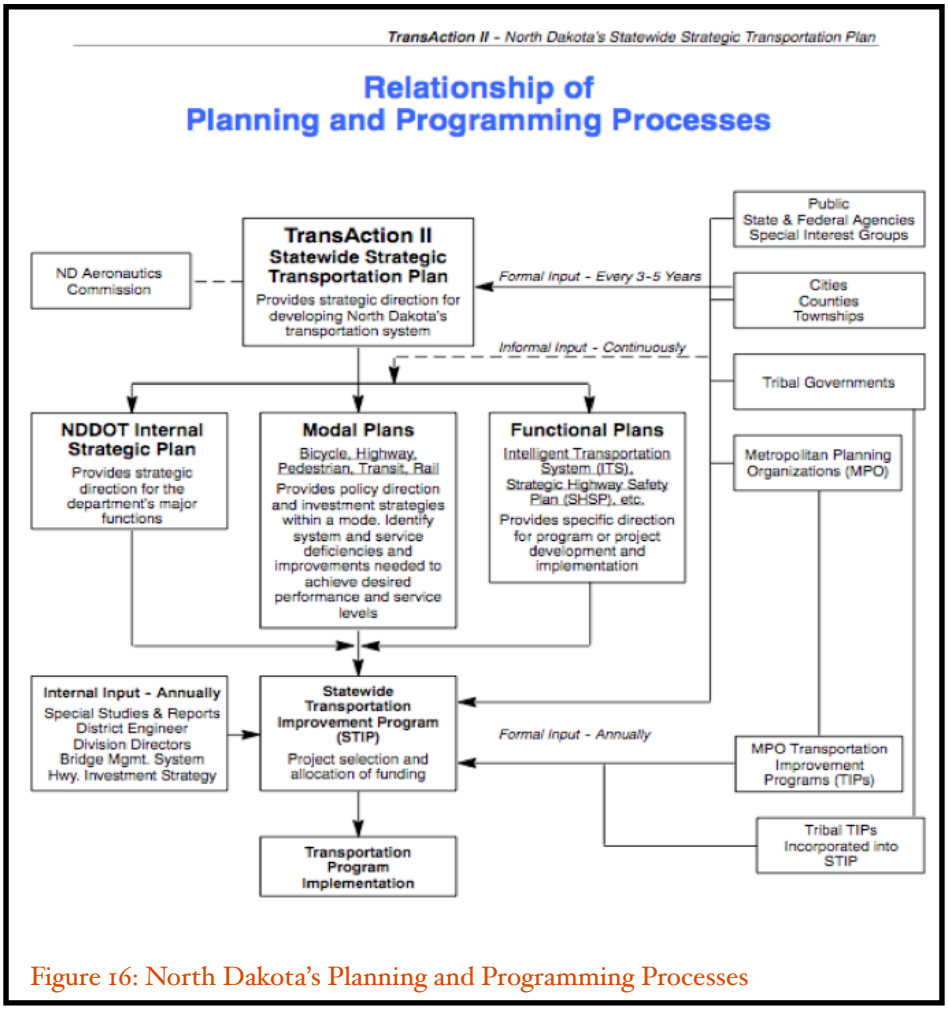


Figure 16: North Dakota's Planning and Programming Processes

Figure 16 is the process outlined in North Dakota's strategic plan. It tends to suggest a topdown approach with informal suggestions from MPO and tribal plans, and a direct link between all three types of plans at the STIP stage.

Finally, ***Figure 17*** is Oregon's process. It illustrates a very interactive process. Arrows point in both directions between most of the boxes on the chart.

Figure 18 is another view of the Oregon process. It depicts a much more directed process. Direction flows from the state plan to modal efforts and local plans.

These examples illustrate that no one approach is correct. All will work. It is important to outline these relationships so that those people who are not intimately involved in the processes can better understand how they fit into the activities they have been asked to take part in. It may also help planners to see the flow.

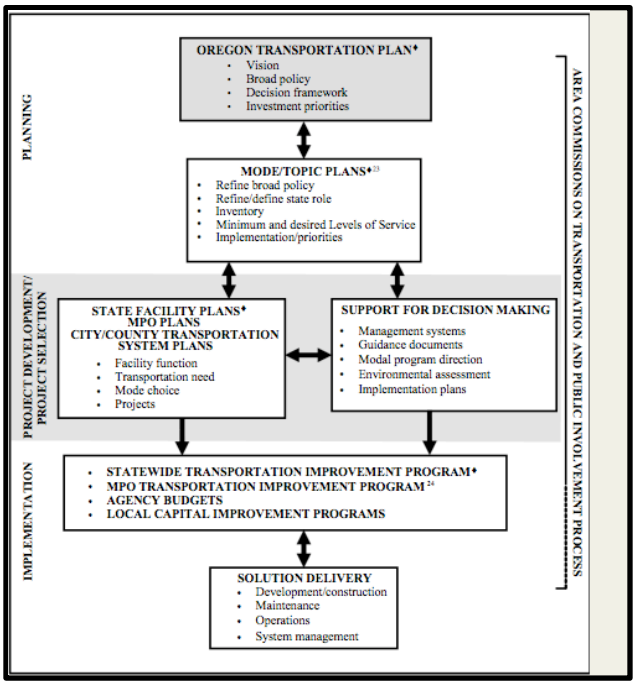


Figure 17: Oregon's Planning, Programming, and Implementation Processes

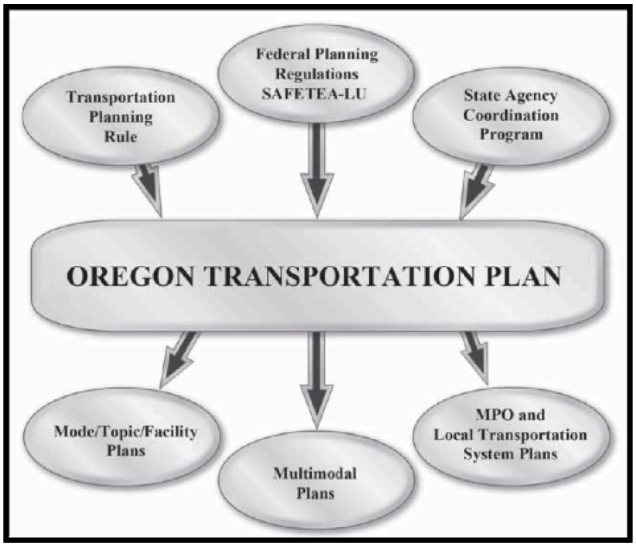


Figure 18: Oregon's Transportation Plan

Industry Involvement

A major challenge in most freight planning efforts is getting the private sector to actively participate. ***Figure 19*** illustrates the problem.

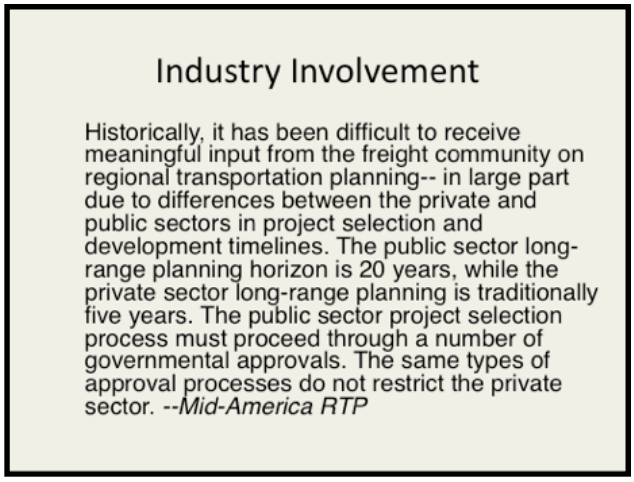


Figure 19: The Problem of Industry Involvement

While involvement may be a challenge, it is essential that this challenge be overcome, because the private sector, shippers, and carriers, are the people who know the business and the obstacles that it faces. Overcoming the challenge begins with an understanding of the barriers to participation, ***Figure 20***.

Figure 20: Common Barriers to Industry Participation

Different time horizons is the most discussed barrier. The private sector considers a three to five year period as long term; the public sector uses twenty to thirty years. Only those of us who have worked in the public sector can understand a three-decade time horizon. The private sector can site and build a major facility in months, or years. They simply do not comprehend, or care to comprehend, the hurdles that force a public effort to take so much time. The burden is on the public sector representative to understand and overcome the challenge.

Time commitments are another issue. Many members of the freight community work in small to medium sized businesses. Those businesses rarely have “staff” in the sense that the word is used in the public sector. The person who would take part in a public planning effort is also the person who has an ongoing responsibility to manage the company, or a significant part of the company. Given a choice between attending a planning meeting or meeting with a customer, the planning meeting will lose. Again, the burden is on the public sector.

Closely tied to time horizons are an understanding of public processes and the relevance of those processes. Could anyone but a public employee care about federal and state planning regulations? Yet, most planning documents and too many planning meetings start with a recitation of those rules. Stick to the issues that are important to the audience.

Trust is basic to every relationship. In this case, it is useful to remember that many people in the private sector have most interactions with the public sector on regulatory and enforcement efforts. They may not readily distinguish between the department of transportation and the state patrol. Some effort will be required to explain the difference. Competitive pressures influence many actions taken by the private sector, and yet the public sector often invites real or perceived competitors to the same meeting and asks

that they be open, that they share their issues and their processes. It's not likely to happen.

Finally, public understanding of the private sector is also a challenge. Public planners must take the time to better understand the environment in which the private sector operates. Such understanding will ease communication and build trust.

Figure 21 illustrates the steps in private sector participation. The graphic was inspired by a presentation made by a member of the FHWA Freight Office.

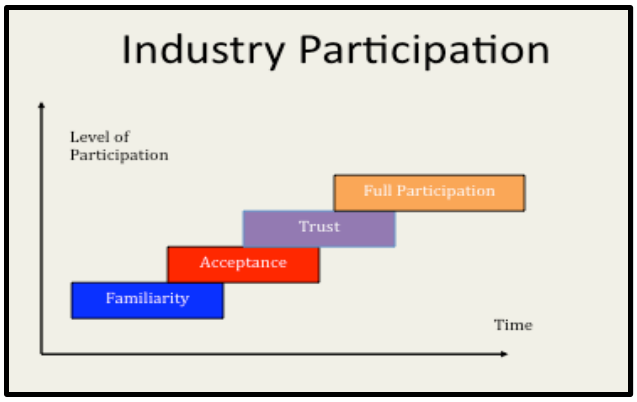


Figure 21: Steps to Private Sector Participation

As ***Figure 21*** illustrates, participation is develoed over time. The first step is familiarity. Face-to-face contact is the key to familiarity. Make an appointment with a shipper or a carrier. Explain your role and ask for their help in understanding the industry. Go to their office prepared with some good questions and listen. Most industry people will try hard to help you understand their business. At their offices and with respect for their time this can be a very good starting point.

Acceptance, step two, takes more time. Demonstrate that you're really interested and that you'll be around. Ask to be put on mailing lists for industry meetings. Sit in on meetings of the timber producers, the corn growers, or the transportation committee of the state chamber of commerce. Get to know the people in the industry.

Trust is the next and most difficult step. It requires that you display a consistency in your purposes and a transparency in your processes. In short, you must demonstrate honesty. You might also provide some useful service for your customers or partners. For example, one state freight policy office provides updates to truckers on freeway closures and advisories.

With trust comes full participation. This still may not mean that everyone will show up for committee meetings and/or be open in front of their competitors, but it will mean that when you ask, you'll get good information.

This is a time-consuming process. Too often people try a short cut. They want full participation without going through the processes that are needed to make the industry members familiar, accepting, and trusting.

Freight Advisory Committees

Many states and MPOs have established freight advisory committees to establish an ongoing dialog with the industry. ***Figure 22*** lists a number of questions that you may want to consider as you think about establishing a freight advisory committee.

Figure 23 lists possible roles for a committee. Private sector contribution is the most obvious. Committees are usually established to provide a forum for the private sector into public sector planning and related activities. Networking is another role it might play. If this is a primary role, the committee sponsor should still have meaningful agendas so that participants feel the meetings are worthwhile. The sponsor might also want to ensure that senior people within the agency are present. Networking with peers would seem to be most useful for company managers and owners.

Finally, some advisory committees, most notably in Oregon, have a role in selecting projects for funding under state freight programs.

Figure 24 lists several membership options. If nearly all the issues you plan to bring to a committee are related to trucking—size and weight, fees, safety, highway operations, etc.—you may want to consider establishing a trucking industry advisory committee. This would save those industry groups who are not involved in those issues from sitting through what might be fairly meaningless discussions.

Figure 22: Advisory Committee Questions

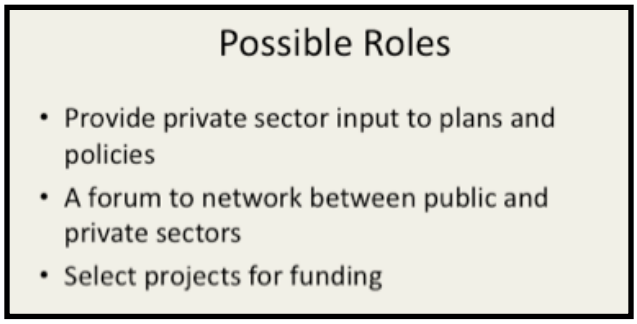


Figure 23: Possible Advisory Committee Roles

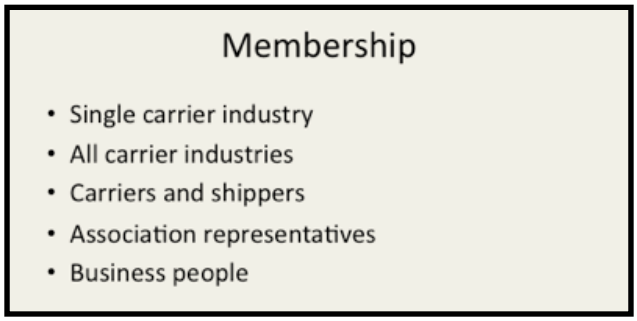


Figure 24: Advisory Committee Membership Options

If you really plan to bring broader, multi-modal issues to the committee, it might be made up of representatives of all the carrier industries, trucking, rail, water, and air.

If you want to better understand why freight moves the way that it does, or if you plan to bring regulatory options like time of day delivery or congestion pricing, you may want to include shippers on the committee. They will best be able to speak to those issues.

Finally, do you want real people or association representatives to sit on the committee? In some cases, for example class I railroads, you will likely get representatives. They are the people whose job it is to deal with government issues. In others, you may get a mix, or even a choice. Consider the type of issues

and participation that you want as you evaluate membership options. If you will be dealing with legislative policy issues, you may want association people at the table. They will tend to have a good understanding of those issues. If your concern is more with operational issues, you may want to strive for real business people. You might also want to consider the expected time commitment. If it is major, you may be better served with association representatives.

Time commitments should be considered realistically. As ***Figure 25*** reports, even after many successful years of a Freight Advisory Committee, Minnesota suggests that one half day per quarter is about all that you can ask of private sector people. They simply have too much on their schedules to allow a greater time commitment.

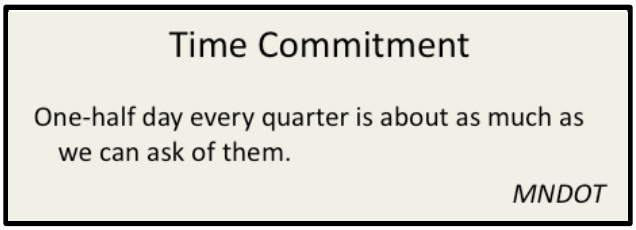


Figure 25: Time Commitments

Committees can also be structured as temporary or permanent. ***Figure 26*** lists some questions that you might ask as you make this decision. While a permanent committee can provide a useful forum for ongoing communication with industry, it must be supported by both the agency and the industry and it must have a meaningful role. Agency support is significant, because the staffing of a standing committee can be a large task. If it is to have industry support, it must also have a meaningful role.

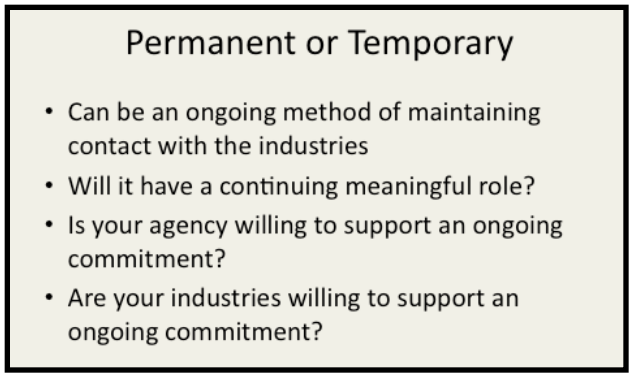


Figure 26: Permanent or Temporary Committee

The next question, the authority under which the committee is established, may or may not be a significant issue. ***Figure 27*** outlines three possible sources of authority. Some states have statutes that require the establishment of a freight advisory committee. Again, Oregon is an example. The advantage that such an approach may have is to raise the significance of serving: serving on a committee established in the law with regular reporting to the Governor and the legislature may be more prestigious to potential members. Other approaches are under the authority of administrative rule, which has the force of law, but probably not the same prestige, or appointment by the agency head. Most of the examples found fall into the last category. With interest from senior people in the agency, such authority seems to work.

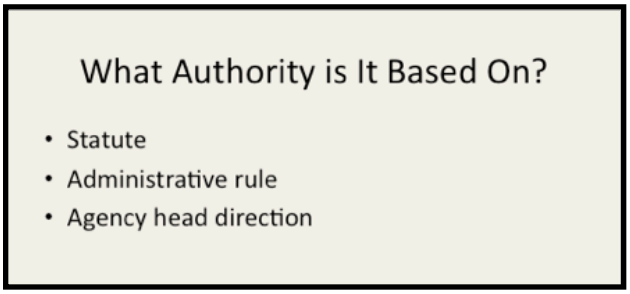


Figure 27: The Authority

Finally, one might consider whether other forums already exist that might satisfy the needs of the agency. ***Figure 28*** lists three possibilities. Two examples can be cited. The first is the Seattle Roundtable. It is a forum jointly sponsored by the

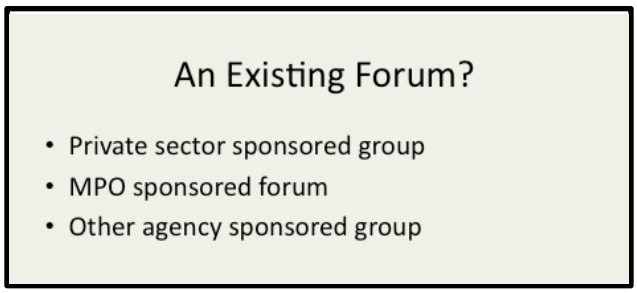


Figure 28: The Use of Other Existing Forums

MPO and the private sector, but used by the state DOT. The other example is a quasi-public group in Indiana, Conexus Indiana. This group is a partnership between business, academia and government. Its goal is to improve the business climate in Indiana. One of its subcommittees deals with transportation and is used by the DOT as an advisory group. The advantage of this approach is that the group has a wider agenda, making it easier to create meaningful ongoing agendas. The business community already supports its parent group, so participation is more easily achieved.

Defining the Freight Community

After reading many freight plans, or freight plan elements, one could assume that the freight community is a single entity, with similar needs, issues, and desires. That is not the case and some effort should be expended to better define the elements of that community. ***Figure 29*** offers some thoughts on the freight community.

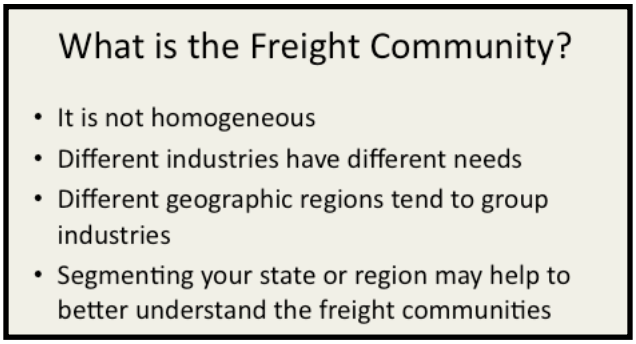


Figure 29: Defining the Freight Community

Washington and Minnesota have each made an effort to do such segmentation. ***Figure 30*** shows how Washington divided the state into regions that tend to represent fairly homogeneous economic areas. One grows wheat and needs good rail service at harvest time. Another grows tree fruit and must have refrigerated transport when the fruit is picked. Another is largely forest products. Another is manufacturing. Each has very different freight needs.

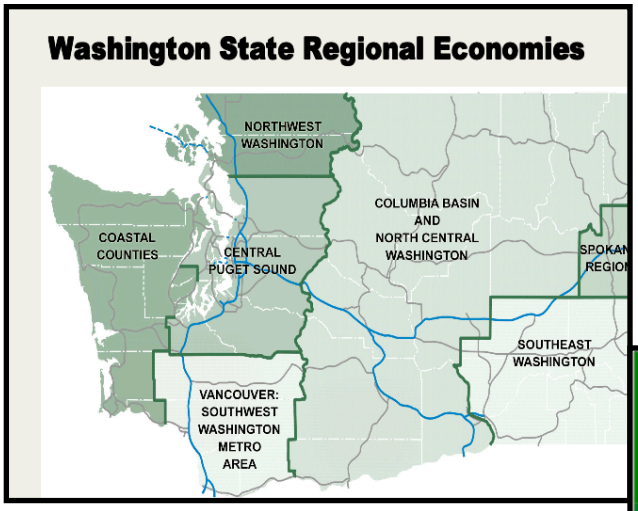


Figure 30: Washington's Economic Segmentation

Figure 31 is Minnesota's approach. As in Washington, each of these regions tend to have shared economic characteristics that affect their transportation needs. They intend to use it to define regional freight studies. It also integrates with their overall planning process. This is how MnDOT describes these regions:

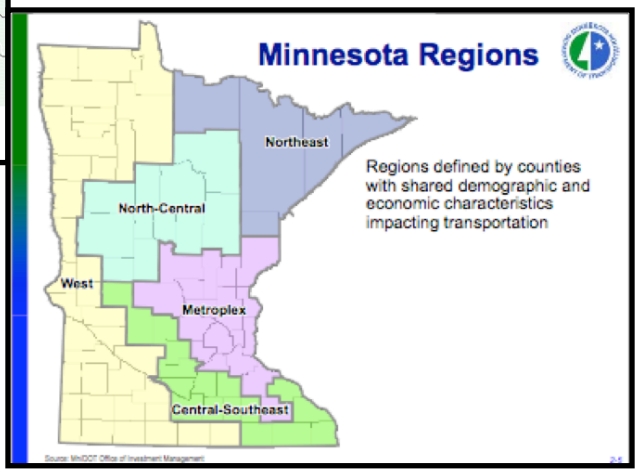


Figure 31: Minnesota's Economic Regions

This graphic introduces five regions within Minnesota that help to describe differences and similarities within the state. A 2007 analysis of demographic and economic trends over the last 20 years and transportation data by county was reviewed, and counties were aggregated by region:

- **Metroplex**: Encompassing Rochester, the Twin Cities, and St. Cloud areas, the Metroplex has seen high population and employment growth. It's characterized by younger more diverse populations, diverse economies, heavy VMT and transit use, and the availability of multimodal transportation options for people & freight. (In 2005, 60 percent of Minnesota's population lived in the eleven counties including and surrounding the Twin Cities.)

- **North Central**: Population and employment are growing (e.g. construction), recreation and tourism industry, service industry economy. There is growing VMT with unique traffic peaking patterns. There has been significant lake area development. Key cities: Alexandria, Brainerd/ Baxter, Detroit Lakes, Fergus Falls, Little Falls, Park Rapids, etc.

- **Northeast**: This region shows an aging population and slow growth; educated labor force; significant resource-based industry (especially forestry and mining); evolving economy w/job losses in mining and industry, increasing jobs in health, wholesale, accommodation, and retail. Key Cities: Duluth/Superior, Grand Rapids, Hibbing, International Falls

- **West**: Most counties lost population from 1992 through 2005; many counties lost jobs or had low job growth rates; agriculture remains the region's economic base, although the area is diversifying in manufacturing and renewable energy (wind & ethanol). Key cities: Fargo/ Moorhead, Grand Forks/E. Grand Forks, Marshall, Montevideo, Morris, Crookston, Thief River Falls

- Central-Southeast: The region's population is aging with some population and employment growth. Employment is concentrated in manufacturing. The area has diverse transportation: roads, rivers, and railroads. Its agriculture sector is important to the region's economy; there is growth in renewable energy (ethanol). Key Cities: Mankato, Albert Lea, Owatonna, Winona, LaCrosse/ LaCrescent

In each case, the regions can be further divided for focus by specific economic sector—manufacturing, agriculture, etc.—and by carrier type. ***Figure 32*** illustrates how Washington further divided its regions when it conducted 453 interviews to better understand issues facing the industries.

Segment	Interviews
NE WA Spokane manufacturers	23
NE WA/Spokane wood	7
NE WA/Spokane trucking	11
NE WA/Spokane wholesale	24
SE Agriculture	24
SW WA/Portland manufacturing	25
SW WA/Portland trucking	19
SW WA/Portland wholesale	25
N. Central WA manufacturing	27
N. Central WA agriculture	25
N. Central WA trucking	15
N. Central WA wholesale	26
NW Washington manufacturing	26
NW Washington wood	7
NW Washington trucking	15
Eastside manufacturing	25
South King/Pierce manufacturing	28
Eastside/South King trucking	30
Eastside/South King wholesale	36
Coastal Counties manufacturing	19
Coastal Counties wood	16
Total	**453**

Figure 32: Washington's Segmentation of the Economy

If involving the industry is a challenge, involving the general public can also be a major effort. The following comes from efforts to do public involvement in the more general transportation planning effort, but all can be applied to freight

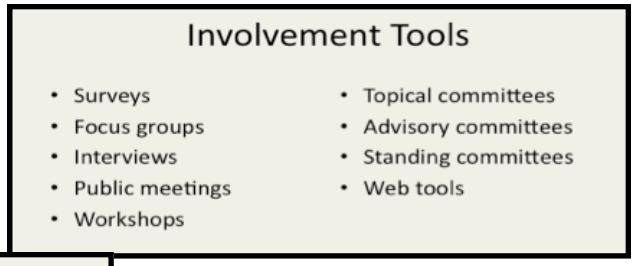


Figure 33: Public Involvement Tools

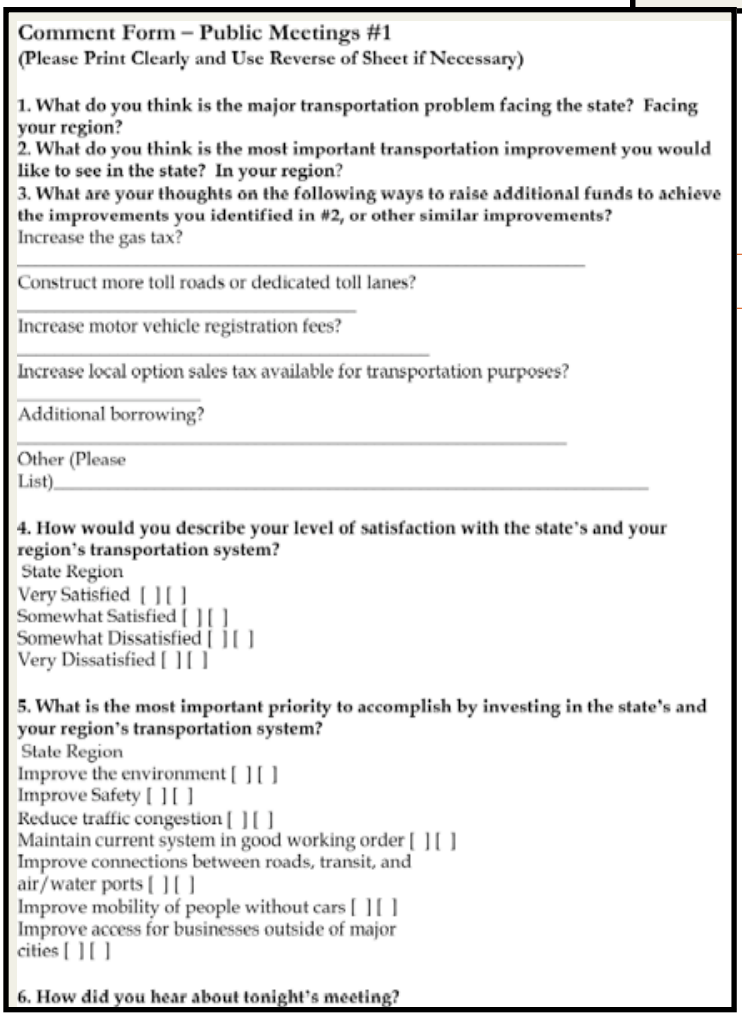
as well. ***Figure 33*** illustrates the range of tools that can be employed. Most are fairly well known. Some may have unique twists.

Surveys

Most agencies used some form of surveys. The state of Georgia had a slightly different twist in that they used surveys to gather specific information at public meeting. ***Figure 34*** is the form they used for that purpose.

The Atlanta Regional Commission, which is the MPO for the Atlanta area, also used a somewhat different survey technique. They asked regional carriers to markup regional maps and answer specific questions to identify bottlenecks in the region, ***Figure 35***.

Ohio used several approaches to collect survey information, ***Figure 36***. Perhaps



Comment Form – Public Meetings #1
(Please Print Clearly and Use Reverse of Sheet if Necessary)

1. What do you think is the major transportation problem facing the state? Facing your region?
2. What do you think is the most important transportation improvement you would like to see in the state? In your region?
3. What are your thoughts on the following ways to raise additional funds to achieve the improvements you identified in #2, or other similar improvements?
Increase the gas tax?
_____
Construct more toll roads or dedicated toll lanes?
_____
Increase motor vehicle registration fees?
_____
Increase local option sales tax available for transportation purposes?
_____
Additional borrowing?
_____
Other (Please List)_____

4. How would you describe your level of satisfaction with the state's and your region's transportation system?
State Region
Very Satisfied [ ] [ ]
Somewhat Satisfied [ ] [ ]
Somewhat Dissatisfied [ ] [ ]
Very Dissatisfied [ ] [ ]

5. What is the most important priority to accomplish by investing in the state's and your region's transportation system?
State Region
Improve the environment [ ] [ ]
Improve Safety [ ] [ ]
Reduce traffic congestion [ ] [ ]
Maintain current system in good working order [ ] [ ]
Improve connections between roads, transit, and air/water ports [ ] [ ]
Improve mobility of people without cars [ ] [ ]
Improve access for businesses outside of major cities [ ] [ ]

6. How did you hear about tonight's meeting?

Figure 34: GA's Survey Tool

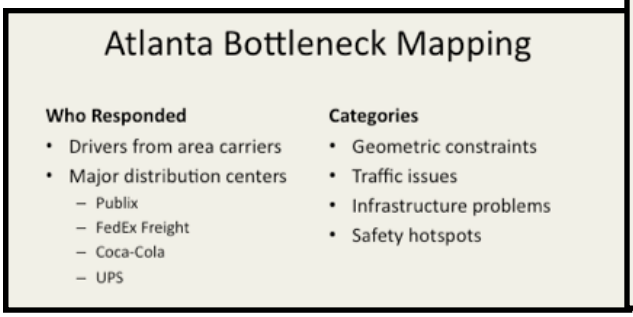


Figure 35: Atlanta's Bottleneck Survey

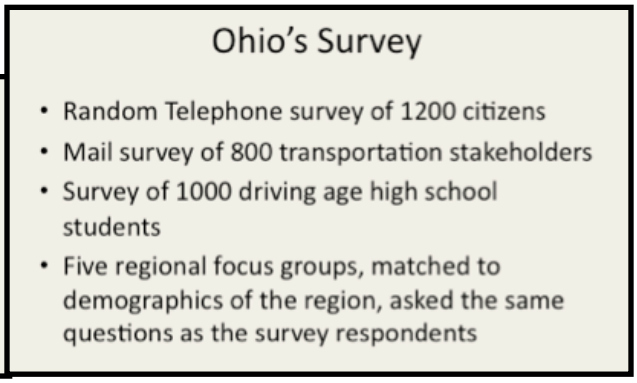


Figure 36: Surveys in Ohio

the most unique aspects of their efforts were the survey focused on high school students and the use of focus groups to try to get regional perspectives.

The Southwestern Pennsylvania Commission used a fairly high tech approach to collecting survey information at their public meetings. A mobile kiosk, including maps on a touch screen computer, allowed the participant to interact with the survey information, ***Figure 37***.

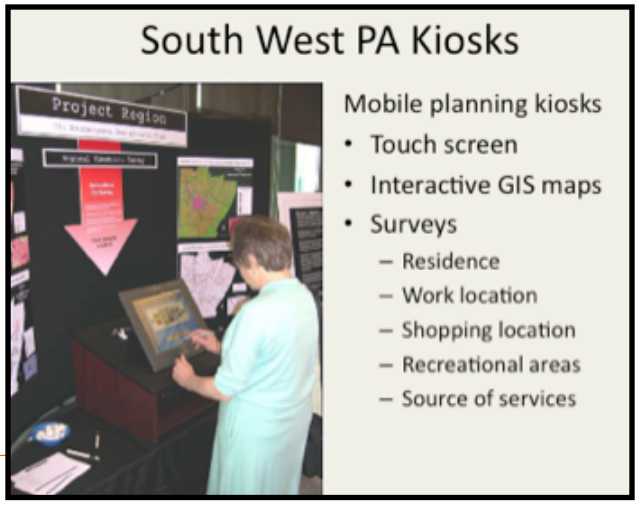


Figure 37: SW PA Kiosks

Interviews

We have already seen that the state of Washington made extensive use of interviews, ***Figure* 32**. Another agency that made extensive use of interviews is the Rogue Valley MPO in Oregon, ***Figure* 38**. Information obtained from the series of interviews became an integral part of their freight plan.

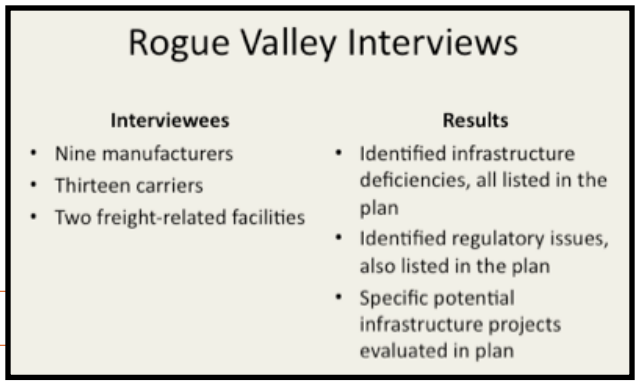


Figure 38: Rogue Valley MPO's use of interviews

Meetings and Workshops

All the planning processes reviewed made some use of public meetings or workshops.

The Southwestern Pennsylvania Commission used fairly unique workshops, involving more than 200 people and a range of techniques, ***Figure 39***. It was a partnership with several other agencies and dealt with economic development.

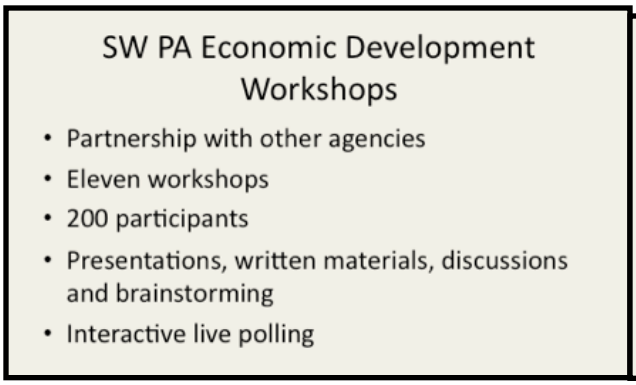


Figure 39: SW PA Workshops

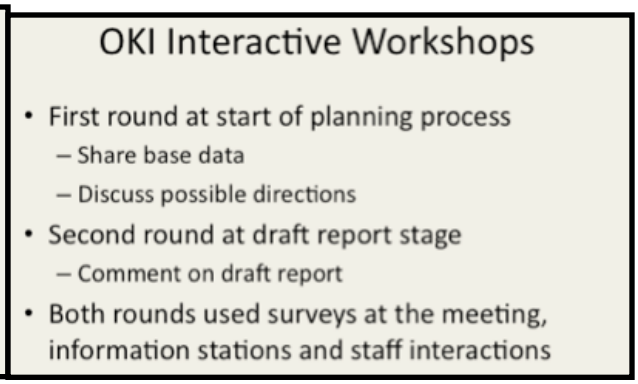


Figure 40: OKI's Workshops

The Ohio, Kentucky, Indiana Council of Governments (OKI) also used a range of techniques in its two rounds of workshops. The first introduced some basic information and approaches to the plan, while the second asked for comments on a draft plan, ***Figure 40***. Another creative approach to holding a public

meeting was KDOT's road rally. To gather public reaction, KDOT invited stakeholders and members of the general public to ride over a defined course and record their reactions to the condition of the facility. Their reactions informed the agency on needs and performance targets. What is more, it was done in a manner that provided meaningful activity for the participants. Their use of the idea was in a highway planning context, but it could be adapted to other topics.

Working Groups

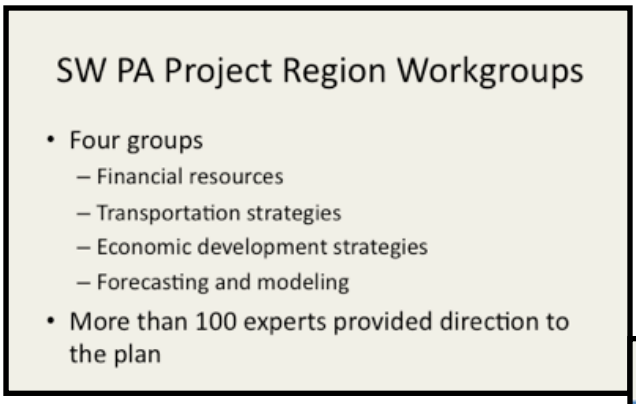


Figure 41: SW PA Workgroups

Southwestern Pennsylvania made good use of such groups. More than 100 people, contributed to one of four groups as their plan was developed. ***Figure 41*** summarizes their experience.

The Kansas DOT also made use of working groups. Six different groups dealt with a wide range of issues. Each had a schedule and planned topics from the outset. ***Figure 42*** lists all the groups and illustrates the schedule for the first three meetings of the freight group.

Working groups were also used by a number of agencies in their planning process. These working groups were organized to deal with specific topical areas. Members brought expertise and involvement to the issue. Through such work groups dozens of people can be involved in the process and can provide significant contributions and insights into the effort.

KDOT Working Groups

Group	Meeting #1	Meeting #2	Meeting #3
Freight	•At-grade crossings •Rail capacity •Highways •Local Roads	•Access •Innovations and opportunities for freight movement •Investment scenarios •Program configuration options	•KDOT organization structure and initiatives
Rural and micropolitan		Note: topics for freight are shown to illustrate the approach	
Metropolitan			
Funding and finance			
Economic impact			

Figure 42: KDOT Working Groups

Advisory Groups and Task Forces

Advisory groups of various kinds were also used by many agencies in their planning processes. The North Dakota DOT used two overlapping advisory groups in its strategic planning effort. The first was called the Director's Advisory Council. It was made up almost entirely of public agency people and developed the broad statements of mission, vision, and goals that guided the plan. It continues to meet at least annually. ***Figure 43*** summarizes the activities of that group.

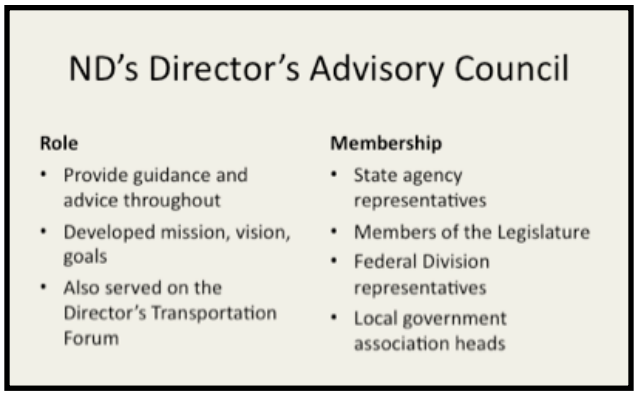


Figure 43: North Dakota's Director's Advisory Council

Figure 44: North Dakota's Director's Transportation Forum

The second group, ***Figure 44***, that contributed to North Dakota's effort was the Director's Transportation Forum. It had a broader membership and developed the strategies to attain the previously defined goals.

New York and Ohio each have or are about to make a very different use of advisory panels. New York appointed such a group and charged it with holding hearings, gathering ideas, and providing information for the master plan. ***Figure 45*** outlines their effort.

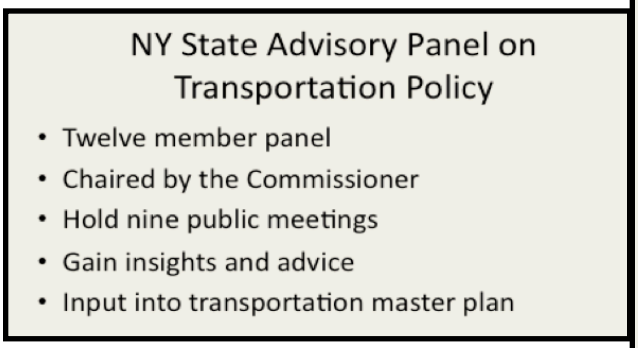


Figure 45: NY's Advisory Panel

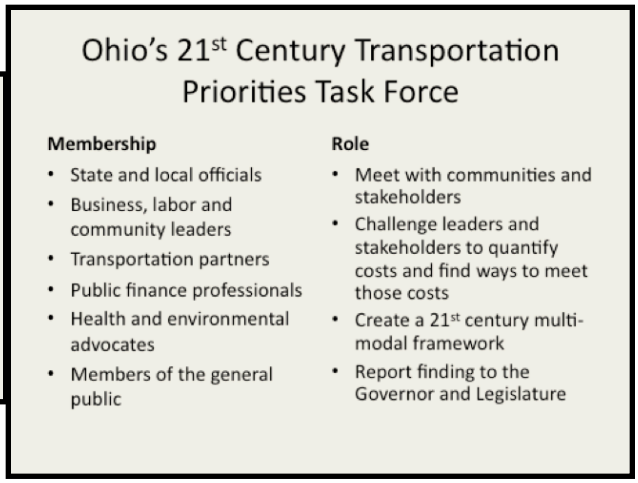


Figure 46: Ohio's Task Force

Ohio has appointed a task force that will also hold hearings to gather ideas, but it will report to the Governor on a wider range of issues. ***Figure 46*** summarizes their plans.

Web Tools

Computer technology is widely used in the planning public involvement processes. We have already seen interactive kiosks, real time voting, and web enabled surveys. Collier County, in Florida, is trying to take this a step further.

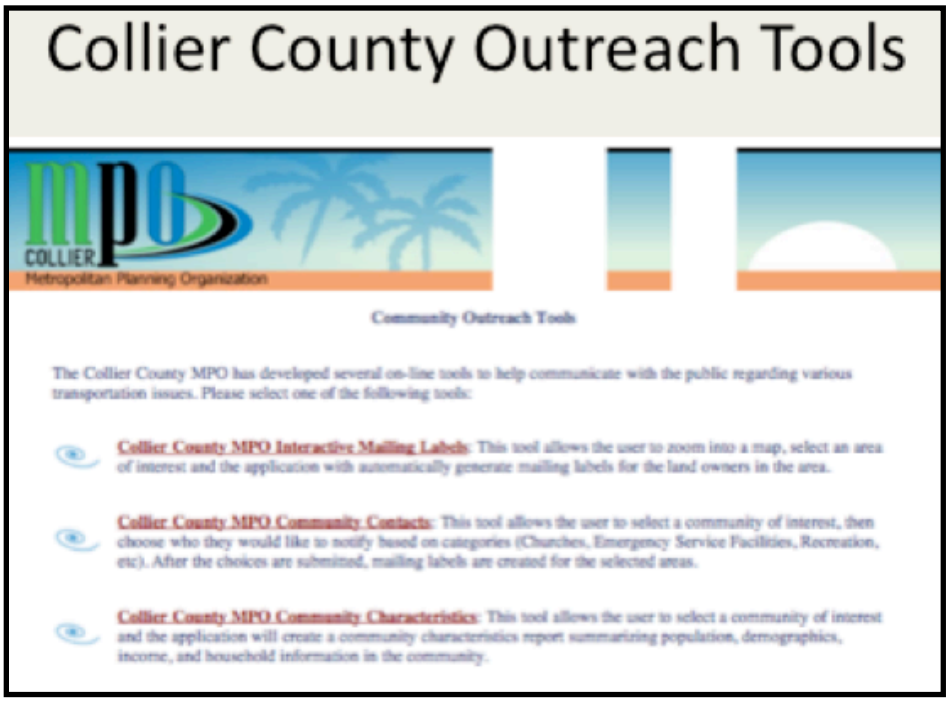


Figure 47: Collier County Web Tools

Figure 47 is screen shot of an online system that allows anyone to interact with the MPO's data systems. From this site, GIS enabled maps can be found to give the user access to land use types, civic boundaries, public places, service providers, and many other community attributes. The tools can be found at http://collier.edats.com/mpo/. It holds interesting possibilities for the future of web-enabled public involvement.

Multi-Modal Planning

Most freight related plans deal with rail, water, and air in some degree. Most describe the role that each of the modes plays in the regional or state transportation system. The extent of service is described, the commodities carried, and the industries that are dependent on the service are also listed. Some plans take the discussion to the level of raising service or performance concerns. The state of Maine, for example, reports the concerns raised by shippers of declining rail service. A very few raise policy issues that might be considered by policy makers. A few also identify research or pilot projects that might be done to consider new or different non-highway services, ***Figure 48***. The reasons for this situation are many. State transportation agencies do not own or operate most railroads, certainly not class I railroads. The federal government has responsibility for most waterways. Good information is often difficult to obtain for

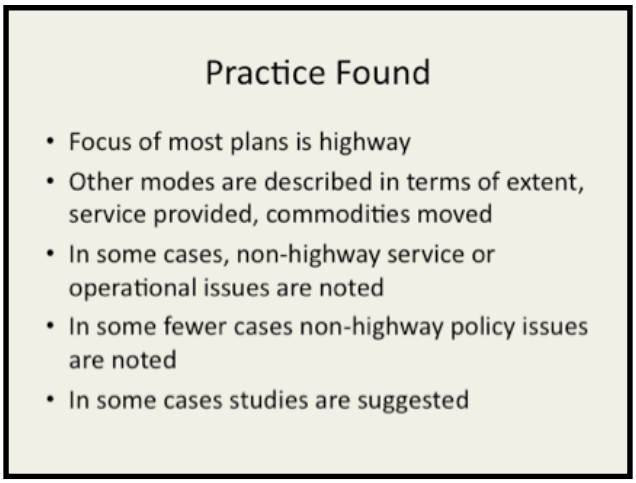


Figure 48: Multi-Modal Planning Practices

non-highway modes. In many cases the extent of the system, for example the class I railroad system, is so great that individual states or regions can have little affect its operations or the service it provides. ***Figure 49*** lists these barriers.

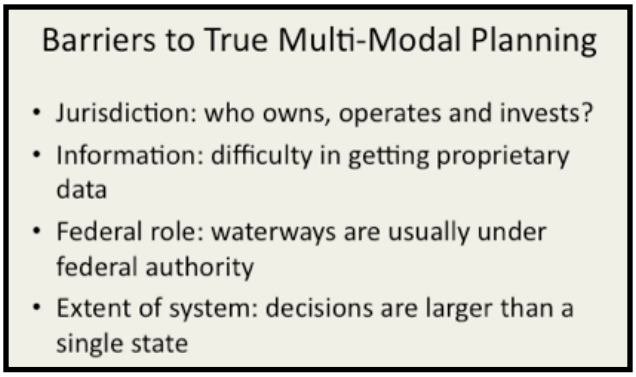


Figure 49: Barriers to Multi-Modal Planning

Given the barriers that exist, what should an agency strive to accomplish with the non-highway modes in its plan? Perhaps the best example of what might be done is a plan from CalTrans, The Goods Movement Action Plan. It deals with a range of issues: air and water quality, congestion, security, safety, and affects on the community. It outlines the freight system, its importance, and the challenges it faces, so it could serve as a basic educational tool. It goes further, making recommendations for operational changes. Some, like cleaner fuels, are already in California law. Others, like spreading the sailing time for shippers, would be a matter for state and local authorities to implement. It also deals with policy issues from the federal arena, for example dredging. Finally, it calls for some study, research, and experimentation: Short sea shipping along the coast or short-haul rail to an inland port to relieve congestion coming from the harbors.

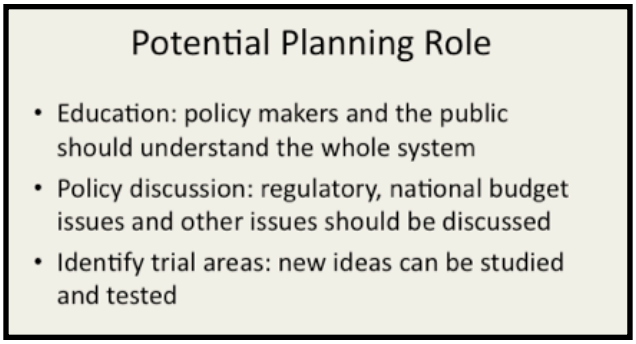


Figure 50: What Might be Done

Overall, it is a plan of a different sort. It is not a blueprint for what should be done to attain some future state. It is a menu of ideas and issues that should be discussed and considered and a listing of issues that the state should influence in the federal arena. ***Figure 50*** outlines some thoughts on what might be done.

Performance Measures

Performance measures are another area in which many agencies are struggling, but some are making progress. ***Figure 51*** lists the attributes that performance measures should have, as seen by one researcher. That they should be linked to strategic goals seems obvious. As does reflecting the range of issues important to the agency. They should reflect the significant aspect of the issue and be carefully chosen. This makes sense because if they miss significant aspects of the issue, the measure could be attained but the objective lost. Measures are in large part a communication device, so they must be understood. Finally, they should influence the direction of the agency, so they must be used correctly.

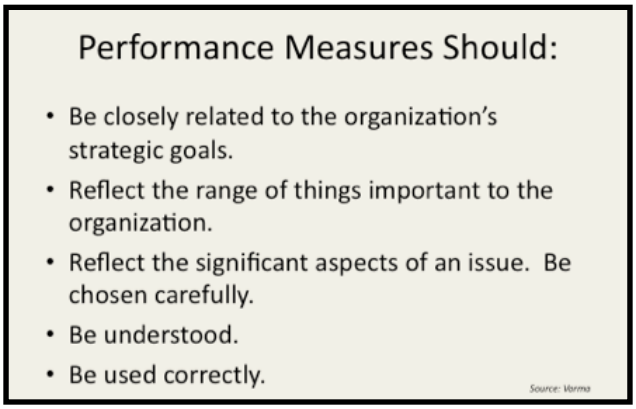


Figure 51: Performance Measures

Agencies have taken different approaches to defining measures, but most have identified focus areas and then moved to measurable aspects of those focus areas. The East-West Gateway Coordinating Council is an example of an agency that defined it focus areas and then moved to measurable aspects of those areas, ***Figure 52***.

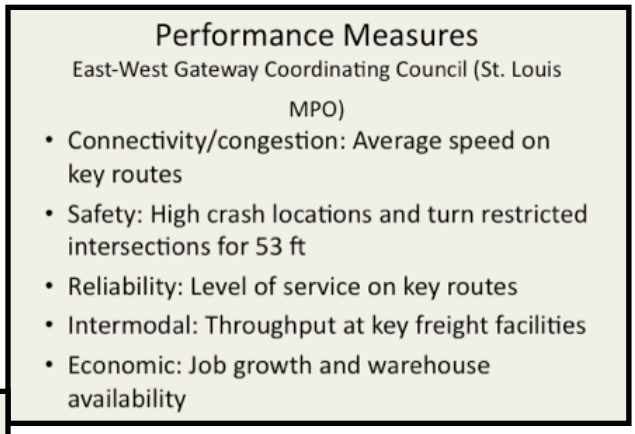


Figure 52: St. Louis Priority Areas and Measures

New York State also developed focus areas, or, as they called them, Priority Result Areas (PRAs), ***Figure 53***. Their plan does not list specific measures for each area.

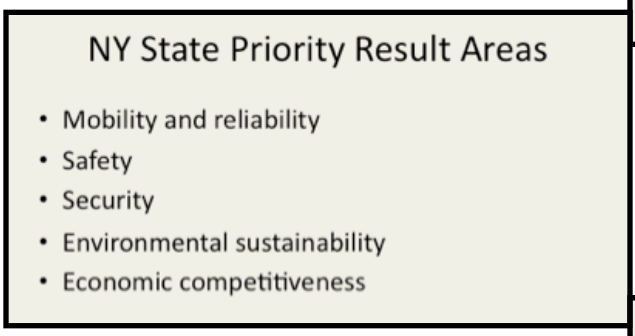


Figure 53: New York's Focus Areas

The Kansas DOT took a somewhat similar approach, although their plan is closer to a strategic plan. It includes a range of issues of importance to the agency. Recognizing the importance of the plan and its measures as a communications tool, they organized all the focus areas around the single overriding goal of performance, ***Figure 54***. Like other agencies, they struggle with the specific measures that define each of the performance areas. They try to keep the number small, so their struggle is to find a key measure that defines each area. To date, they have not hit on measures that meet that need.

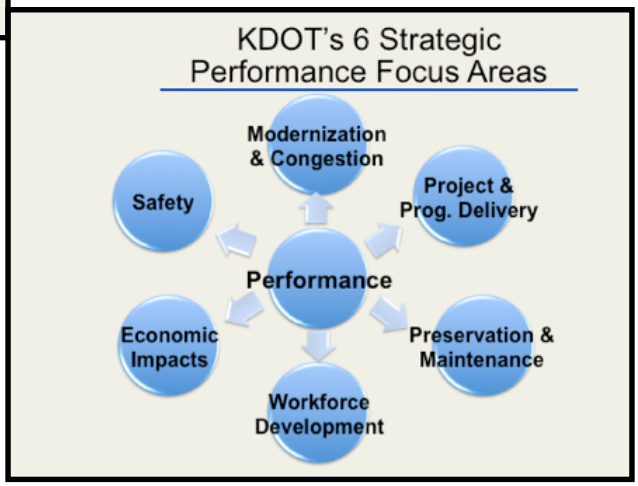


Figure 54: KDOT's Focus Areas

Ohio has also taken the focus area approach. In ***Figure 55***, only one of those focus areas is highlighted to illustrate how they found measures that define critical aspects of performance within that area. Several measures are quite specific, while others are more of a policy or investment thrust. All, however, can be measured and reported.

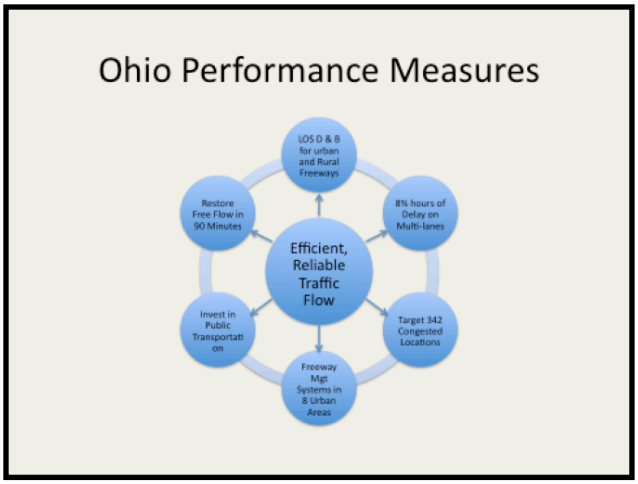


Figure 55: One of Ohio's Focus Areas and Measures

The Oregon DOT has also taken an approach that could be called focus areas. In their plan, they referred to Policies and Strategies. ***Figure 56*** shows one of their policies and the strategies that flow from it.

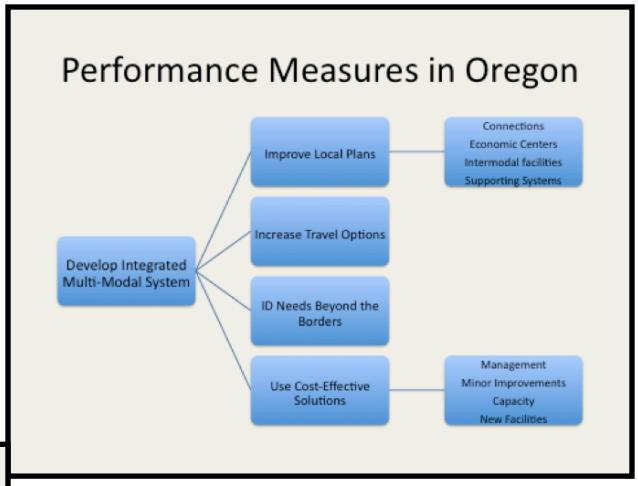


Figure 56: Policies and Strategies In Oregon

In another document related to the update of their plan, Freight Issues, a number of specific recommendations are made on improvement areas for the state related to freight. In some cases more specific actions are also suggested, as summarized in ***Figure 57***. These actions also provide focus, but they fall short of true measureable activities.

Oregon Freight Recommendations

Goal	Strategy
Enhance Oregon's Competitive Position	•Support improvements to the NHS connectors •Maintain Columbia River navigation channel •Support hwy and rail improvements in I-5 corridor
Create comprehensive freight agenda for state and metro areas	•Expand state and local freight planning •Establish process to prioritize funding for projects that demonstrably improve the economy
Advance the public role in passenger and freight rail	Provide stable funding for short-line and mainline rail improvements, including 3Ps
Increase freight reliability	Use full range of methods
Streamline environmental process	
Promote security	
Support E-commerce	

Figure 57: Oregon Freight Recommendations

Lima-Allen County, in Ohio, identified a number of initiatives to support their goal for transportation in support of economic development. While the initiatives may help to guide the decisions of the agency in the future, they tend to be fairly broad and difficult to specifically define or measure, ***Figure 58***.

Lima-Allen County Economic Goal:
Develop transportation system that will strengthen economic development initiatives

1. Advance improvements that support industrial growth
2. Implement projects that promote intercity development
3. Integrate transit, highway and rail infrastructure
4. Use transportation to support tourism
5. Provide public transportation to employment

Figure 58: Lima-Allen County Initiatives for Economic Development

OKI took a somewhat similar approach to identifying goals and objectives. Two of their goals that relate to freight are summarized in ***Figure 59***.

OKI Goals and Objectives

Goal	Objective
Improve accessibility and mobility options for people and goods	•Improve operating efficiency of existing infrastructure •Expand infrastructure to provide capacity and access •Expand alternatives to single-occupant vehicle
Support economic vitality	•Implement techniques to improve traffic flow to improve travel time reliability and travel costs •Increase availability of traveler information (ARTIMIS)

Figure 59: OKI Freight-Related Goals and Objectives

Again they are broad policy thrusts that will provide guidance, but are difficult to measure.

Minnesota has done more work than most on real performance measures related to freight. They too began with broad areas of direction, ***Figure 60***. Actual freight related measures are shown in ***Figures 61*** and ***62***. The difficulty here is that the measures relate directly to mode and would have to be cross-walked back to the policy direction.

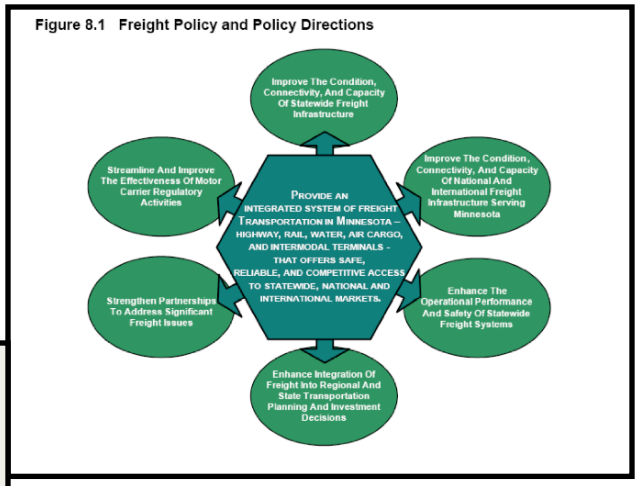


Figure 60: MNDOT's Freight Policy and Direction

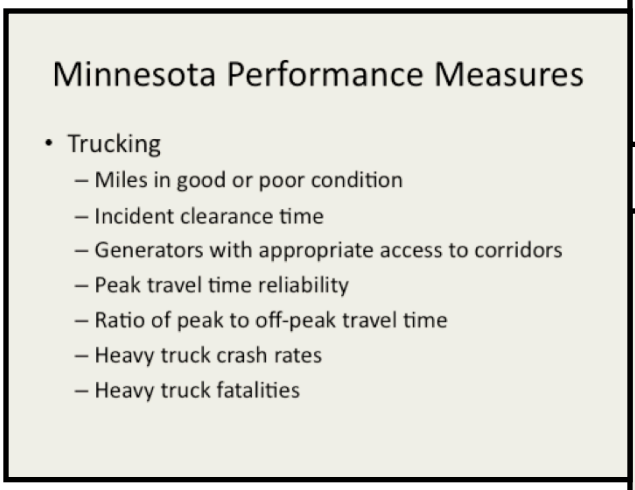


Figure 61: Truck Measures in MnDOT

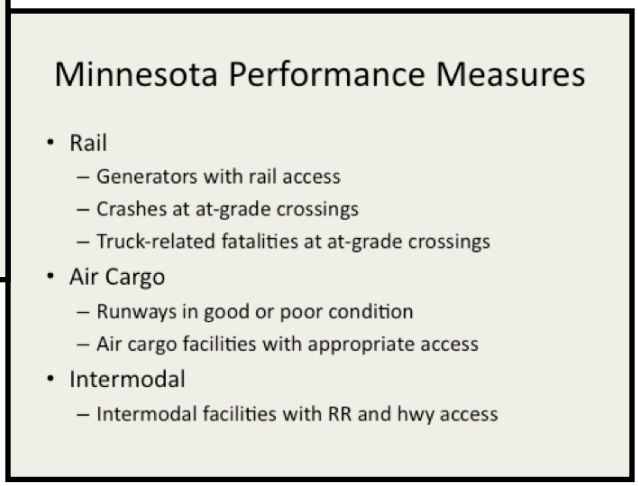


Figure 62: Freight Measures in MNDOT

Implementation and Monitoring

Making a plan more than a coffee table book is the topic of this section. Those states and agencies that have been most successful in making plans real have done so by making them a vital part of how the agency is managed. North Dakota is an example. Their plan is essentially a strategic plan. It is simple and it is reported to senior management and senior management reviews progress regularly. North Dakota also publishes a newsletter that updates stakeholders on the progress of their plan in fairly qualitative terms. Kansas is another state in which the executive staff monitors the policy direction contained in the plan regularly. In both cases, the plan is much more than a shelf ornament.

Minnesota, Washington, and Ohio are examples of several states that report on a range of performance measures, including those related to freight and their overall plan, on a regular basis. Some report very widely, while others report only to management. In either case, reporting tends to provide continued focus.

The East-West Gateway Coordinating Council is another agency that has tried to make the plan real. It issues an annual freight report card and has defined a clear flow from plan through implementation in its processes. This process is diagrammed in ***Figure 63***.

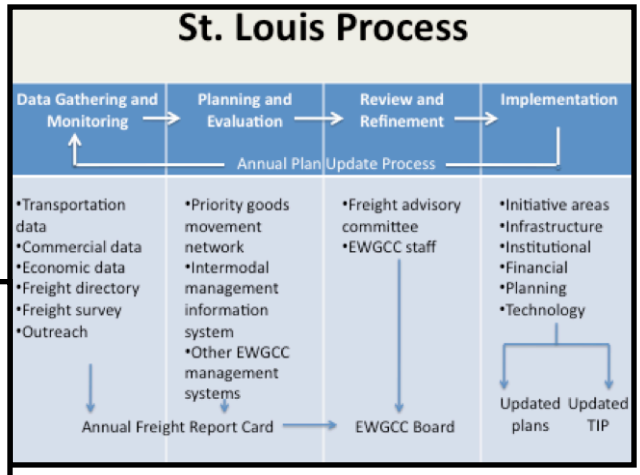


Figure 63: East-West Gateway Process

FIGURE 4-3
CAPACITY PROJECT EVALUATION MATRIX

TRANSPORTATION OUTLOOK 2030 ROADWAY SCORING CRITERIA			
	MAJOR CRITERIA	PERCENTAGE	
1	**SYSTEM EFFICIENCY**	40	points
1.1	Average Daily Traffic	20%	
1.2	Forecasted Daily Traffic (without improvement)	15%	
1.3	Forecasted Daily Traffic (without improvement)	15%	
1.5	Current Level of Service	20%	
1.6	Forecasted Level of Service (without improvement)	15%	
1.7	Forecasted Level of Service (without improvement)	15%	
2	**SYSTEM PRESERVATION**	15	points
2.1	TSM/TDM	35%	
2.2	Access control	15%	
2.3	Element of Reconstruction	50%	
3	**ACCESS TO OPPORTUNITY**	15	points
3.1	Transit Accessibility	50%	
3.2	Accessibility to park-and-ride lots and/or commuter lots	15%	
3.3	Provides access to regional activity center	35%	
4	**REGIONAL ECONOMY**	15	points
4.1	Impacts on goods movement	25%	
4.2	Intermodal connectors	25%	
4.3	Congestion Management	25%	
4.4	Provides access to regional activity center	25%	
5	**QUALITY BUILT & NATURAL ENVIRONMENT**	15	points
5.1	Future population & employment served	25%	
5.2	Encourage more efficient land use	25%	
5.3	Bike/Ped plan or project element	25%	
5.4	Air quality impacts	10%	
5.5	Transportation Enhancements	15%	
6	**SAFETY**	10	points
6.1	Accident Data	100%	
	TOTAL MAX POINTS	##	points

Figure 64: Mid-America Capacity Project Evaluation Criteria

The Mid-America Regional Council in Kansas City attempted to influence the selection of construction projects by introducing some freight specific criteria in the project evaluation process. Their revised criteria are shown in ***Figure 64***.

Another tool used by several states is defining trade corridors or priority investment corridors. These routes or corridors tend to focus the investment strategies of the state, giving greater weight to investments that further the completion or improvement of these most important corridors or routes.

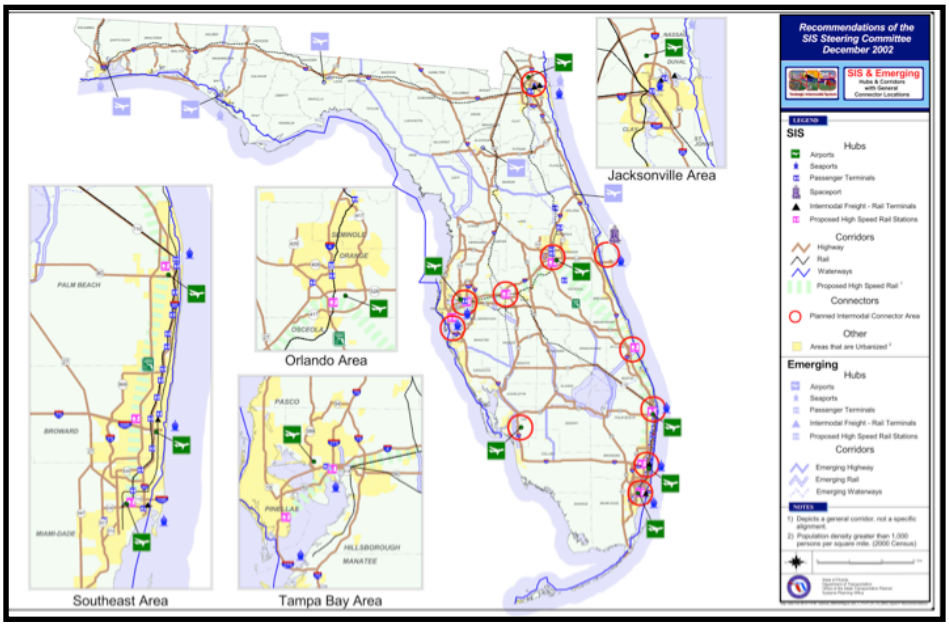


Figure 65: Florida's Strategic Intermodal System

Florida is a good example. It has defined and continually updates its Strategic Intermodal System (SIS). This SIS is composed of transportation corridors and facilities of statewide and interregional significance for more efficiently moving both passengers and freight, ***Figure 65***.

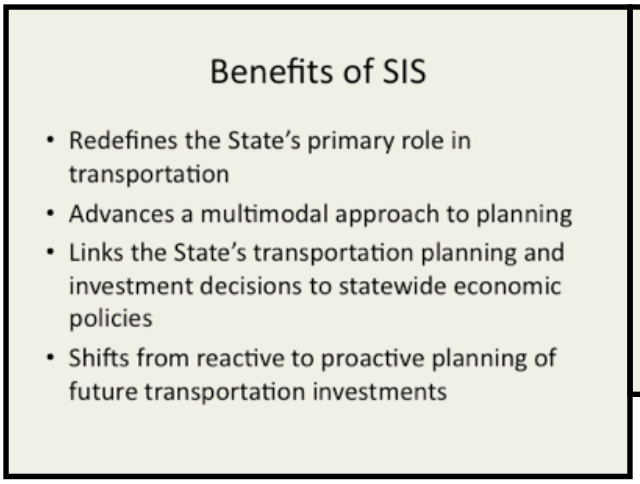


Figure 66: Benefits of SIS

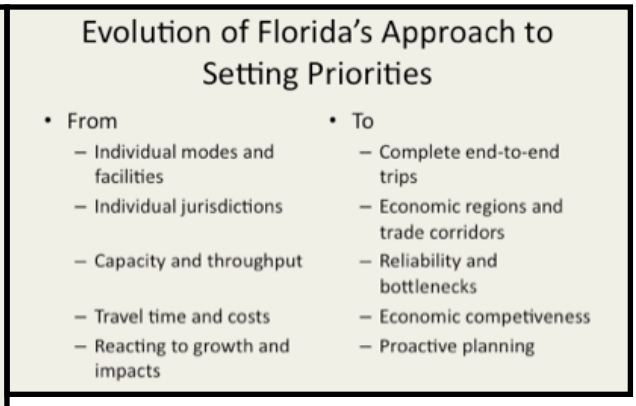


Figure 67: Florida's Evolution

The benefits of the SIS from Florida's perspective are shown in ***Figure 66***. One of the benefits is defining the state role.

The state credits the SIS in part for transforming its approach to setting priorities. The change is outlined in ***Figure 67***. The state is now much more proactive in their approach.

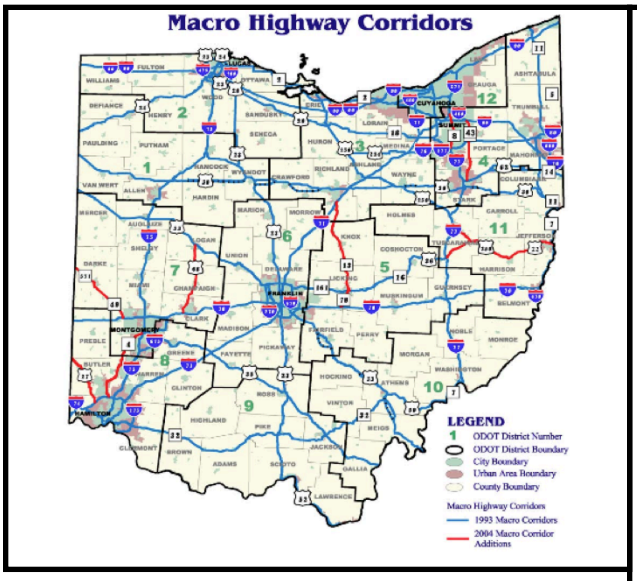


Figure 68: Ohio Macro Highway Corridors

Other states have taken a similar approach to corridor definition. Each in some way gives priority to investments that complete or improve their selected systems. ***Figures 68, 69,*** and ***70*** illustrate systems in Ohio, Minnesota, and New York.

Figure 69: MnDOT's Interregional Corridor System

Finally, like many other organizations, MnDOT is trying to insert some freight perspective into a wide range of ongoing departmental activities as a way of making the plan have life and as a way of making the state's freight system work better. ***Figure 71*** lists their recommendations, not all of which have been implemented.

Figure 71: Integrating Freight

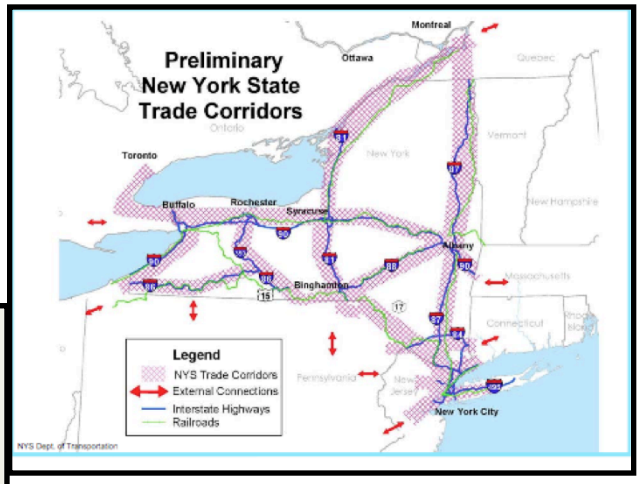


Figure 70: New York's Trade Corridors

Data

Data collection and analysis is an integral part of the freight planning process. It provides decision makers a rational method to predict the need for freight infrastructure, to assess the potential affects of proposed transportation investments, and to plan for future investments. The importance of freight data is underscored by the provisions in SAFETEA-LU for enhancement of freight data collection practices and data development programs to support planning. While data alone cannot guarantee good decisions, informed decision making requires good data. Many planners share the sentiment that good freight data are hard to come by. Current analysis methods are also often predetermined by the available data. To avoid falling in the decision traps of only using and thinking within currently available data sets, you need to first think of your agency's decision needs and then establish your data needs and collection efforts accordingly.

Data used for freight planning should be related to the appropriate level of applications, ranging from policy, planning, programming, project development, investment decisions, and modal operations. This is evident, for example, in New York DOT's illustration of their freight data needs, ***Figure 72***. Obviously, no single data source is likely to serve all needs. Rather, you will need to combine multiple data sources to paint a comprehensive picture of freight movement patterns in your planning region.

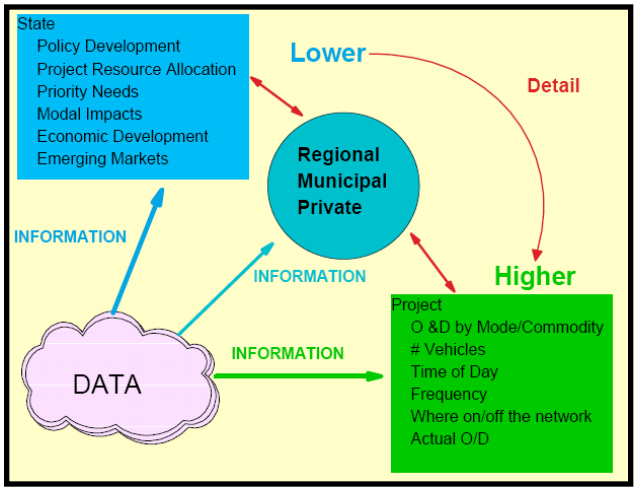


Figure 72: Illustration of varying freight data needs (Source: Erlbaum, 2001)

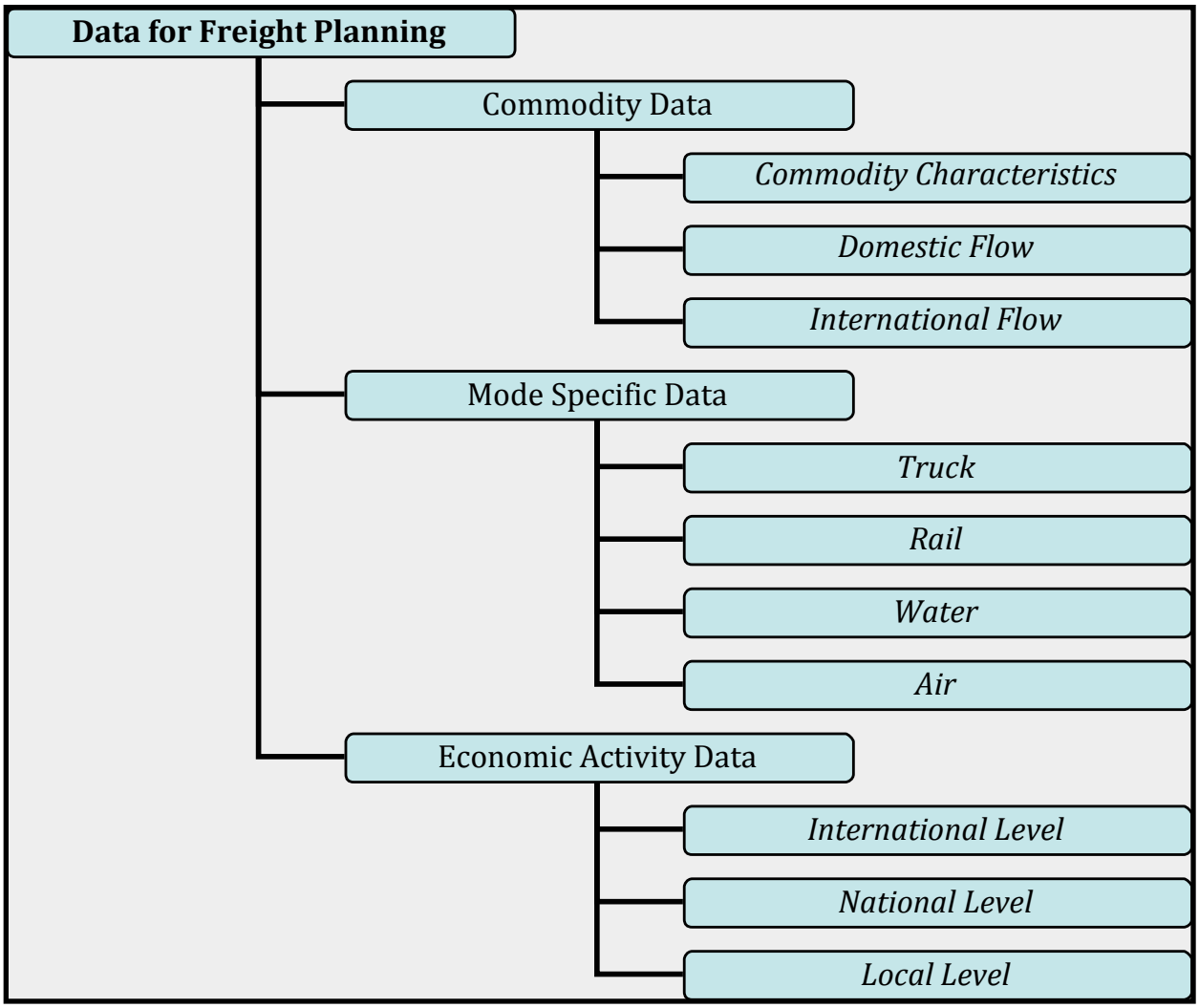


Figure 73: Types of data useful for freight planning

Sources of freight data vary broadly. Some are readily provided by federal agencies; others are available as off-the-shelf proprietary data. Many states and local agencies also develop their own freight data tools. Typically, each data source has a different level of modal or geographic coverage at different levels of disaggregation. ***Figure 73*** provides a summary of data items typically used to support current freight planning processes. These data items generally fall within three categories: (a) commodity related data, (b) mode specific data, and (c) economic activity data. The nature, purpose, and source of each data category are described below.

For a more comprehensive catalog of federal and proprietary sources of data related to freight, readers are referred to Section 5 of NCHRP Report 594: Guidebook for Integrating Freight into Transportation Planning and Project Selection Processes (Cambridge Systematics et. al., 2007), and http://www.ops.fhwa.dot.gov/freight/freight_analysis/data_sources.htm, FHWA Office of Freight Management and Operations' *Data Sources*.

Commodity Data

An understanding of the commodities that are shipped, received, or passing through a region is fundamental to effective freight planning. To gain this understanding, you should consider at least the following three types of commodity related data:

- **Commodity characteristics** data that describe the nature of the commodities being moved and the activities involved in moving a product from suppliers to customers;
- **Domestic commodity flow** data that describe the movement of commodities at the regional and local levels;
- **International commodity flow** data that describe the trading of commodities in and out of the U.S.

Commodity Characteristics Data

Knowing the nature of commodities, such as unit weight, volume, and time-sensitivity, allows planners to understand how different industry sectors may have evolved over time and the transportation requirements and characteristics for their goods. This understanding is needed for estimating the movement of goods from economic activities (and visa versa) and assessing the potential affects of policies and/or projects on different industries.

Commodity information is typically collected through industry-specific surveys. For example, the state of Washington conducted a series of surveys between 2001 and 2007 to collect commodity information as part of the Strategic Freight Transportation Analysis (SFTA) (WSDOT, 2003). SFTA is a statewide research and implementation project designed to analyze existing conditions, which provides a basis for recommended enhancements to the freight mobility transportation system. The surveys include:

- Survey of Wheat and Barley Elevators throughout Eastern Washington
- Forest Products Survey
- Mining and Minerals Survey
- Fruit and Vegetables, Wine, Hay, Livestock Survey

Domestic Commodity Flow Data

Commodity flow data informs planners of the movement of goods. This is a key source of information for determining current freight transportation patterns and for estimating future demand. Described below are a number of off-the-shelf sources for commodity flow data.

Commodity Flow Survey (CFS)

A commonly used source of commodity flow data is the CFS from the U.S. Census Bureau. The CFS captures data on shipments originating from

> ***A concern with using data sources such as the FAF and TRANSEARCH is the data quality. For instance, CalTrans found substantial discrepancies between the commodity tonnage estimates found in TRANSEARCH and those estimated by the State. The FAF truck counts were also found to be plus or minus 50 percent of Caltrans road counts. Validation of these data would require collaboration and data provision from private stakeholders.***

business establishments in mining, manufacturing, wholesale trade, and selected retail industries located in the 50 states and the District of Columbia. The survey coverage excludes establishments classified as farms, forestry, fisheries, governments,

construction, transportation, foreign establishments, services, and most establishments in retail. Information collected about shipments includes:

- Domestic destination or port of exit,
- Commodity,
- Value,
- Weight,
- Mode(s) of transportation,
- Date on which the shipment was made,
- Whether the shipment was an export, and
- Whether the shipment was hazardous material.

The CFS data is released at various geographical levels. It includes predefined data tables showing interstate freight flows as well as flows by commodity type and by mode for any given state. It also provides freight flows by mode and commodity for the major metropolitan areas in the country, allowing commodity origin-destination tables to be estimated. Moreover, both tonnage and value data are also available for the freight flows. These data can be used to develop ton-value conversion factors, which are used to convert tonnage flows to value of shipment flows.

The major limitation of CFS is that it does not contain the necessary breadth of commodity types and detailed data needed for freight models. It needs to be supplemented by other sources of data.

Freight Analysis Framework (FAF)

The FAF integrates data from a variety of sources, including the CFS, to estimate commodity flows and freight related transportation activity among states, regions, and major international gateways. It provides estimated tonnage and value of goods shipped by type of commodity and mode of transportation among and within 114 areas, as well as to and from 7 international trading regions though the 114 areas plus 17 additional international gateways. This is currently available for base year 2002. The FAF also provides projections of changes in those flows and activity based on shifts in economic conditions, availability of transportation facilities, and other factors. The projections are available for years 2010 through 2035 in 5-year intervals.

The Office of Freight Management and Operations of the FHWA designed the FAF to support policy analysis under various scenarios. According to the former program manager for FAF, Dr. Tianjia Tang, the FAF is designed to support "…corridor analysis among States on the Nation's transportation infrastructure facilities. It provides the analytical ability to perform various capacity and congestion analyses over the highway network at a corridor level. These analyses enable the identification of regionally and nationally significant freight corridors."

Since the initial release of FAF results in 2000, the FAF has become a major data product for the larger transportation community. FAF is also the only publicly available source for freight forecast data. The growth rates in the FAF are often used and applied to different types of existing freight flow data that are collected. For local agencies, the key to using FAF data successfully is to fuse it with local data and gain a better understanding of how the data might be used as a basis for identifying and prioritizing needed improvements.

TRANSEARCH Insights

This is a proprietary database sold by Global Insights. Formerly, this database was offered by Reebie Associates before its merger with Global Insights. Similarly to the CFS and the FAF, TRANSEARCH data provides commodity-specific, mode-specific, and origin-destination freight flow data. Specifically, the annually updated U.S. Freight Transportation Market database is used to apply quantitative economic models to create accurate forecasts of freight volumes to 2030.

The primary advantage of TRANSEARCH data over the CFS and FAF is that the data can be bought at the county level. Additionally, Global Insights also offers forecasts that match the data format for base year TRANSEARCH data. Having freight flow data at the county level is particularly important for transportation planners, because it can be more easily mapped to the road network and translated into truck volumes. The county level data are often further disaggregated to the traffic analysis zone level and joined to existing travel demand models to assign truck and auto volumes. The county level data also provide more detailed information about intrastate trading partners, along with counties that are particularly dependent on interstate and international trade.

The main limitation of the TRANSEARCH data is that it represents an estimation of total trips, but it is more accurate for long haul trips than for local trips. Routing information is available only as a model output. There are no raw data for either of these elements. For truck traffic, the dataset is limited for non-manufactured products. Supplemental purchases may be made for agricultural and mining resource extraction shipments from the source to a processing plant that are not ordinarily covered in commodity flow surveys (Beagan et.al., 2007).

International Commodity Flow Data

International commodity flow data informs us of the intensity and pattern of international trade, which significantly affects domestic freight movements for many obvious reasons. Such data help planning agencies to monitor freight movements across our international borders; assess the national significance of existing transportation facilities; identify the infrastructure needs in response to changes in the global economy; and, evaluate the consequences of international accords (such as the North American Free Trade Agreement or NAFTA) on the transportation system and the economy.

Cross-border Trade

The TransBorder Freight Database contains freight flow data by commodity type and by mode, including truck, rail, pipeline, air, vessel, and other, for U.S. exports to and imports from Canada and Mexico. The database includes two sets of tables: one provides detailed transportation flows while the other is commodity based without as much transportation detail. The dataset is compiled by the Census Bureau

based on its Census Foreign Trade Statistics Program, which collects administrative records of import and export merchandise as required by the Departments of Commerce and Treasury. The Bureau of Transportation Statistics (BTS) provides access to the data through the TransBoarder web interface. This allows users to create, view, and download multivariate cross-tabulations. Alternatively, users can also download the data in raw formats to customize and manipulate for specific purposes.

The TransBorder data has been used primarily for monitoring freight flows since the signing of NAFTA in 1992 and its entry into force in 1994. It is also being used for trade corridor studies, transportation infrastructure planning, marketing and logistics plans, and other purposes. The next data release will be on June 30, 2008.

Seaborne Trade

The main provider of proprietary international seaborne trade data is the Port Import Export Reporting Service (PIERS). It maintains a database of import and export information on cargo moving through ports in the U.S., Mexico, Latin America, and Asia. PIERS has access to import and export data due to the Freedom of Information Act along with U.S. Customs Regulations, which authorize press organizations to copy certain shipping documents available to the public. PIERS data is collected from over 25,000 bills of lading everyday. Information about U.S. imports is obtained from vessel manifests and U.S. Customs Automated Manifest Systems (AMS) data tapes from all U.S. ports. Similarly, export information is obtained from documentation submitted by ship lines as required by law at all U.S. ports. Along with U.S. import and export data, PIERS also provides global data for countries including Mexico, Brazil, Chile, Colombia, Ecuador, Peru, and Venezuela.

Mode-Specific Data

To identify and locate needed freight infrastructure and operational improvements, planning agencies typically need to consult data describing the volume, value, and traffic associated with freight movements of specific modes.

Truck

Truck data is a critical need for the calibration and validation of the regional truck models. It is also important for the development of congestion alleviation measures. Often, truck data are compiled from local freight data collection efforts. This is because national level data such as the FAF are not available at the level of detail required for regional planning. Discussed below are commonly used federal data sources as well as methods typically used to collect local data.

Truck Trip Origin-Destination Data

Truck trip origin-destination data describes the truck movements that are required to move commodities between origin-destination pairs. This type of data is often collected using roadside intercept surveys. Intercept surveys typically include questions about the trip origin (last stop) and destination (next stop), cargo characteristics, driver characteristics, and vehicle characteristics, e.g., weight, length, and number of axles. Sometimes they are also designed to include questions about the routes used to traverse

between the origin and destination. These surveys can also be expanded to incorporate questions about truck drivers' preferences and needs concerning freight infrastructure and travel conditions.

Roadside intercept surveys can be costly and time consuming. For example, the cost for collecting sufficient truck travel data for the state of Texas is estimated to be over $5 million (Prozzi et. al., 2004). Therefore, few planning agencies have conducted such surveys. An exception is the California Heavy Duty Truck Survey conducted by CalTrans in 1999. Data were collected at 50 sites throughout the state including weight stations, agricultural inspection stations, and roadside rest areas. A total of over 8 thousand interviews were conducted. Part of this survey data was used to supplement Southern California Association of Governments' (SCAG) intercept survey. This survey was conducted at 10 sites during November 2001 at 10 locations within the SCAG region. Most recently, New York State DOT and Thruway Authority are in the process of surveying truck drivers traveling on the New York highway system (NYDOT, 2008). Data were collected at 15 sites to the west of I-81 during April 2008. The next phase of data collection is scheduled for September and October 2008 at another 15 sites to the east of I-81. Surveys take place at each intercept site on one week day and one weekend day between noon and 9 p.m.

As pointed out in the Quick Response Freight Manual II (Beagan et. al., 2007), roadside intercept surveys generally yield a high response rate, offer better control over the sample, and allow the collection of comprehensive truck trip information in a single interview. The main drawback to the survey method pertains to the limited number of locations where intercept surveys may be implemented in a region. This can lead to sampling bias in the truck travel characteristics determined from the survey. Other limitations include the potential disruption to traffic and safety and security risks for survey personnel.

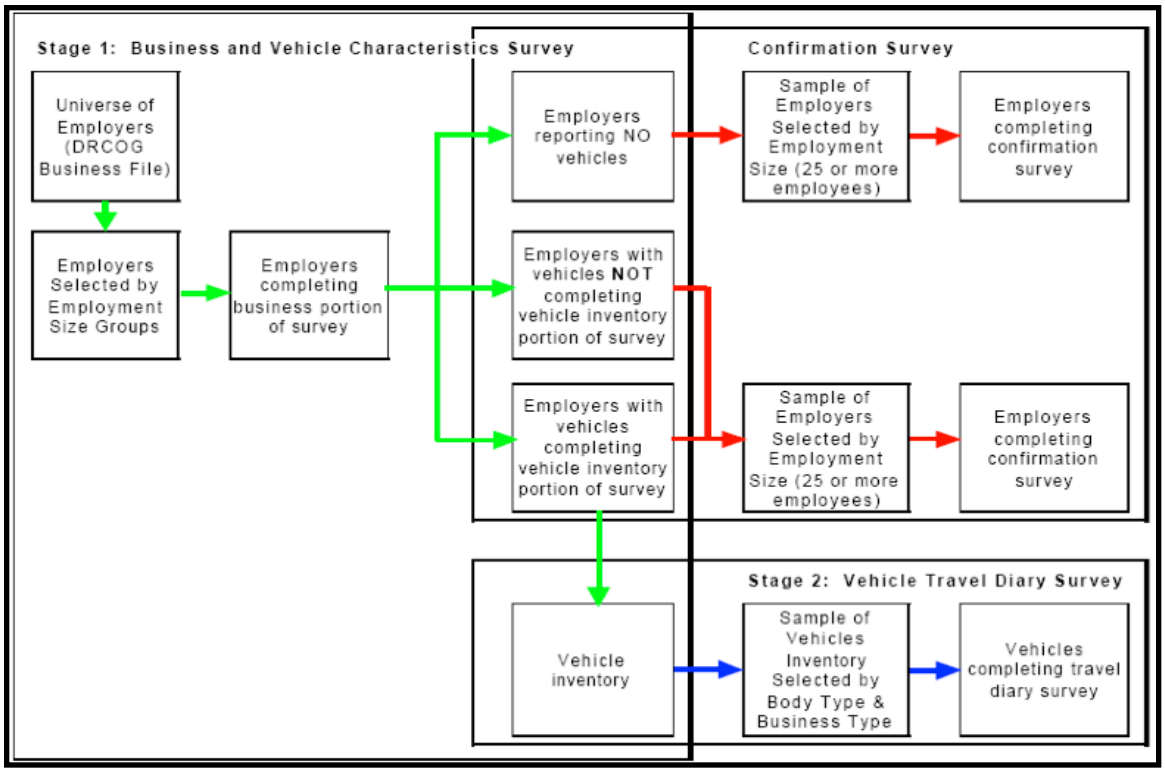


Figure 74: Commercial vehicle survey process adopted by the Denver Regional Council of Governments (Source: DRCG, 2001, p.3)

An

alternative approach to collecting truck origin-destination data is through establishment surveys to shippers and carriers who own trucks. These surveys usually include a general questionnaire that gathers data on facility type, hours of operation, size of business, types and volume of shipments handled, daily and seasonal time distributions, and primary routes used. The questionnaire can be augmented with a vehicle travel diary survey to collect detailed origin-destination, travel time, and routing information. The Denver Regional Council of Governments (DRCOG) designed and implemented such a survey in 1998, ***Figure 74***. Business and vehicle information were collected from 4,903 randomly selected businesses, representing about a 5.4 percent sample of the 89,980 businesses in the study region. A travel diary survey was conducted of 832 of the 3,681 commercial vehicles garaged at the sampled business sites. The business survey was performed by telephone. The information collected through the business survey was entered into a pool of available commercial vehicles, from which a subset of vehicles was selected. The survey firm contacted the selected business owning the vehicle to participate in the travel diary survey. The travel diary form was mailed to the business to record one day's travel for each vehicle selected.

Vehicle Classification and Counts

Truck count data are critical for the calibration and validation of freight forecasting models. For instance, they can be used to develop truck trip generation rates for freight facilities as a function of economic variables, such as employment. Truck count data are also used to aide decision making about improvements to transportation facilities. For example, the choice of road geometries and pavement materials should account for the amount of overweight truck traffic.

Vehicle counts by class are typically collected either from automated truck count equipment or by weigh-in-motion data. Automated counting methods often classify vehicles by axle counts and spacing because the equipment is limited in what vehicle characteristics it can track. In contrast, weigh-in-motion usually classifies trucks by vehicle weights. In the state of Washington, the Transportation Data Office maintains the DOT's vehicle classification count data. Using data on truck weights and payloads from weight stations and the Eastern Washington Intermodal Transportation Study (EWITS), the Traffic Data Office can estimate tonnage of freight (truck counts multiplied by vehicle weights) moved on each of the state highways. This information is used to identify those roads that carry the most freight.

Vehicle Inventory and Use Survey (VIUS)

The only federal source of truck data is the VIUS. Before 1997, the VIUS was known as the Truck Inventory and Use Survey (TIUS). The first survey was conducted in 1963. It was then conducted every five years, beginning in 1967 and discontinued in 2002. VIUS provides data on the physical characteristics, weight, number of axles, overall length, and body type, of the nation's medium and heavy truck population. Less detailed physical characteristics data are collected for pickups, minivans, other light vans, and sport utility vehicles because they are relatively homogenous in design and use. Operational characteristics data include lease characteristics, operator classification, gas mileage, annual and lifetime miles driven, months operated, commodities hauled by type, and hazardous materials carried.

The primary goal of VIUS is to produce national and state level estimates of the total number of trucks. One common use of VIUS data is to estimate average payload data for trucks. Payload data assign

average shipment weights to trucks based on truck trip distances and commodity type. These payload data can then be used to convert tonnage data into information on the number of trucks needed to haul the tonnage. VIUS data are also often used to develop conversion tables to translate one truck classification system to another, such as translating the number of axles to gross vehicle weight rating. The major drawback to the VIUS is its spatial level of detail. For example, payload factors derived from the VIUS data are only available at the state level and do not necessarily apply to an urban area in the state. In this case, local data collection efforts are needed to provide more representative and accurate data to support local planning efforts.

Rail

The primary source of rail data is the Carload Railroad Waybill Sample administered by the Surface Transportation Board (STB), who has statutory authority over the sample (49 CFR 1244). Railroads terminating over 4,500 cars per year are required to file a 2.5 percent sample of waybills with the STB. The primary purpose of the Carload Waybill Sample is regulatory oversight. This database contains rail shipments data such as origin, destination, commodity, weight, car type, haul length, route, interchange locations, and tariff. This waybill data is used to create a movement specific Confidential Waybill File and is used primarily by federal and state agencies. It is not available for public use. MnDOT is a subscriber to the Railroad Carload Waybill Sample, bought on an annual basis from the STB. These data are used to research rail movements in, to, from, through, and within the state.

A separate public use version of the Sample is available that contains aggregated non-confidential data. Movements are generally aggregated to the Bureau of Economic Analysis (BEA) region level at the 5 digit Standard Transportation Commodity Code level.

Water

The main source of waterborne freight movement data is the Waterborne Commerce of the United States (WCUS) released by the U.S. Army Corps of Engineers (USACE). The USACE has statutory authority over the collection, compilation, and publication of waterborne commerce statistics (33 U.S.C. 555). Individuals and corporations engaged in transporting their own goods on the navigable waters of the United States are required to report data related to vessels, passengers, freight, and tonnage. Parts 1 through 4 of WCUS present detailed data on the movements of vessels and commodities at ports and harbors and on the waterways and canals of the United States and its territories. Part 5 provides statistics on the foreign and domestic waterborne commerce on U.S. waters.

Air

Sources of air freight data is very limited compared to other modes discussed above. The Office of Airline Information at the Bureau of Transportation Statistics provides the volume, payload weight, and origin/destination pattern of domestic and international revenue generating air freight within the United States. Few states have collected and used regional air traffic data to supplement national level data. An exception is California. The Division of Aeronautics at Caltrans collects passenger service, air cargo, and operations activity reports monthly from all commercial service airports to track regional distribution of passenger and air cargo activities. Colorado also has a similar effort to collect air freight data.

Economic Activity Data

Freight movements are derived from the production and consumption of goods. Understanding and predicting freight movements inevitably requires economic activity data that reflect the intensity of production and consumption within the planning area. The major source of economic activity data at the national level is the Economic Census, ***Figure 75***; whereas, more detailed, local level data are typically proprietary. These data sources are described below.

Figure 75: Economic sectors reported in the Economic Census data reports (Source: US Census, 2007)

National Level Data

The Economic Census provides a detailed portrait of the nation's economy once every five years, from the national to the local level. Under Title 13 of the United States Code, sections 131, 191, and 224, firms are required to respond to the census and are subject to penalties for failing to do so. The latest wave, the 2007 Economic Census, covers nearly all the U.S. economy in its basic collection of establishment statistics, ***Figure 76***. The following series of sector-by-sector data are readily available:

- **Industry Series** provides national totals for establishments with employees for individual industries and their products.
- **Geographic Area Series** provides detail for establishments with employees, by industry, for the nation, states, and sub-state areas.
- **Subject Series** provides national and, in some cases, state data on special topics including product lines, concentration ratios, and establishment and firm size. Summary reports for some sectors supersede data from the Industry Series.
- **ZIP Code Statistics** includes counts of establishments by sales size by NAICS code for 5-digit ZIP Codes.

Results from this latest census will be issued on the internet, starting in early 2009 and continuing for more than 2 years.

Local Level Data

A limitation of the Economic Census data is that most detailed variables are available only for the national and state levels. Since the economy of each state and metropolitan area can be very different, county or even finer spatial level data are often needed. A source of economic input-output data at the county level include IMPLAN™ and REMI™. Both are proprietary and can only be used if bought from the respective vendors. These datasets track the economic flows between industry sectors within a given region.

IMPLAN™

Minnesota IMPLAN Group, commonly referred to as IMPLAN, produces data that includes information for 509 industry sectors, typically five digit NAICS in manufacturing and two to four digits for other sectors. Information includes employment, income, value added, household, and government consumption. Along with the data files are national input-output structural matrices. The data files are compiled from a wide variety of sources including the U.S. Bureau of Economic Analysis, the U.S. Bureau of Labor, and the U.S. Bureau of Census.

REMI™

Regional Modeling, Inc. (REMI) is also a private vendor of economic data and tools. REMI is commonly used to estimate the associated economic affects on transportation projects, including direct jobs and wages, and the indirect and induced benefits of transportation improvements.

Integrated Data Systems

In view of the wide array of data involved in freight planning, a number of agencies are integrating various data sources to better support the planning process. Below are some of the leading practices.

MnDOT currently uses its Freight Planning Information System as a data tool to provide planners with goods movement data, particularly origins and destinations of major freight flows. It is used to support commodity flow modeling and corridor level management and analysis. MnDOT has also established the Freight Facilities Database, which includes freight-generating facilities in Minnesota, categorized by business type, commodity, and/or location. Maps and attribute tables can be generated to support integrated, multimodal transportation planning. For more information, see http://www.dot.state.mn.us/ofrw/freightData.html.

The Seaport Office of the Florida DOT developed Florida's Freight Data Clearinghouse as part of its statewide freight transportation program, see http://webservices.camsys.com/fdot/index.htm. The objective of this site is to provide a one stop shop for available freight transportation information, data, and resources for the department and its partners, ***Figure 76***. The site provides an organized library of links to established sources, as well as hosts materials developed as part of the Florida Statewide Freight and Goods Movement Plan, representing a comprehensive summary of the state's freight system.

In California, Caltrans expanded its earlier intermodal management system, originally developed under the requirement of ISTEA, to include freight information. Specifically, their Intermodal Transportation

Figure 76: Florida DOT's one-stop website for data related to freight

Management System (ITIS) is a decision support system that includes all forms of transportation, including passenger and freight rail, air routes, waterways, and intermodal facilities. It is designed to assist transportation planning professionals in making informed decisions in selecting cost-effective actions and strategies, e.g., alternatives analysis using performance measures for improving California's intermodal transportation system. The current version of the system is based on ArcView and operates on both Windows and Macintosh platforms. It links spatial and attribute information for transportation systems for both existing and forecasted conditions. It incorporates TRANSEARCH and PIERS data. Analytical capabilities are continued to be developed and integrated into the system. More information is available at http://www.dot.ca.gov/hq/tpp/offices/oasp/itms.html.

Additional Resources

The FHWA Resource Center and Office of Freight Management and Operations offer a free seminar: *Freight Data Made Simple*. This seminar is part of FHWA's Freight Professional Development Program and is offered to broaden the knowledge base and skills of freight transportation planners and other professionals. It is available to state DOTs, MPOs, local governments, FHWA division offices, and businesses.

Demand Forecasting

Freight modeling is another important aspect of a successful freight planning program. Freight demand forecasting models provide a means for planners to, not only estimate truck volumes in the current context, but also analyze affects of future alternative scenarios on the freight transportation system. Due to the range of factors affecting freight growth and movement patterns, forecasting freight demand is at least as challenging as forecasting passenger travel, if not more. A number of agencies have developed or are developing freight modeling techniques to forecast and simulate future commodity and vehicle flows. However, freight transportation modeling capabilities in many states are limited.

Modeling Approaches

Growth Factor

The simplest approach to forecasting future freight demand is to factor existing freight demand. This is known as the growth factor method. As the name suggests, the procedure involves applying growth factors to baseline freight traffic data or economic variables to project future freight travel demands. Growth factors are commonly used by planning agencies to establish rough estimates of statewide or regional growth for a variety of types of demand. These factors are certainly applicable to establishing freight traffic for the freight component of a transportation plan, program, or project design. At the local level, these methods might be used to project growth in freight traffic in a given corridor or the level of activity at an intermodal facility or port.

Four-Step Model

The most common form of freight demand models adopted by planning agencies follows the traditional four-step modeling approach, originally developed for passenger transport. The four steps correspond to freight generation, distribution, modal split, and freight traffic assignment. The four-step based models can be further categorized into two groups: trip-based and commodity-based approaches. The trip-based

approach has a similar process to the four-step approach of passenger trips in that it directly estimates generation and the attraction of freight vehicle trips. The trip generation step estimates vehicle flows to and from a geographic area as a function of economic variables. In trip distribution, one determines the vehicle trip interchanges between origin and destination zone pairs. Mode choice modeling is used if multimodal trip tables need to be prepared. Using either the market segmentation or the discrete choice modeling approach, one arrives at separate trip flow tables for different freight modes after the mode split step. The process of allocating vehicular flows related to freight to a predefined roadway network is the network assignment step. The same network assignment procedures used for passenger demand modeling apply in the context of freight.

Instead of directly modeling freight vehicle trips, the commodity-based approach recognizes that the freight vehicle movement results from the need to move commodities. Therefore, the commodity-based modeling approach places the focus on the commodities being transported, resulting in a more realistic and policy-sensitive model. Specifically, the commodity-based approach consists of four steps similar to those described above. As depicted in ***Figure 77***, the difference is that the unit of analysis is a ton of goods as opposed to a vehicle trip. For instance, at the end of the mode split step, one obtains multimodal commodity flow tables in annual tons. The annual commodities in tons are then converted to daily trucks using appropriate conversion factors at the end of the modeling process. The main drawback of the commodity-based models lies mainly in its inability to capture empty trips, which are part of freight logistic decisions. This limitation arises from the fact that empty trips are not directly explained by commodity-based modeling approaches.

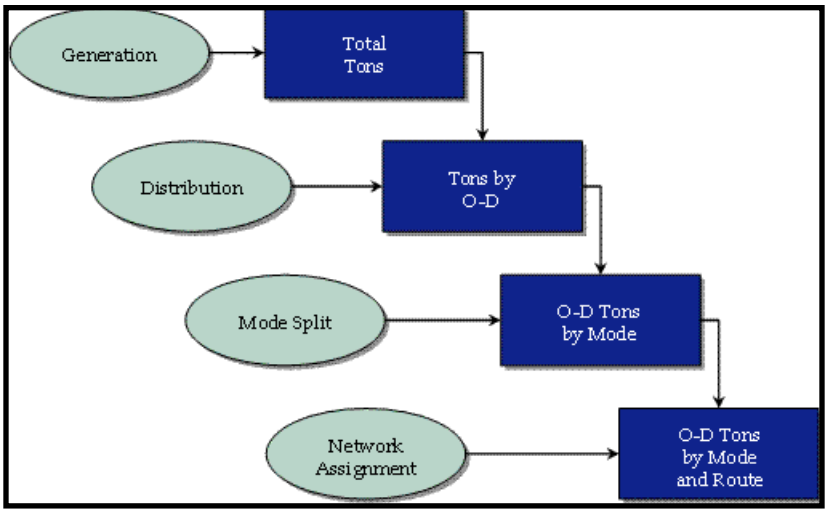


Figure 77: Four-step, commodity-based demand modeling framework (Beagan et. al., 2007)

Tour-Based Models

Tour-based models estimate the number of tours that an individual commercial vehicle will make from when the vehicle leaves the garage to when it returns to the same garage. A number of individual trips typically comprise each tour. Model estimation requires vehicle travel diary data by type of establishments. These establishment models predict the number and types of vehicles, i.e., light, medium, and heavy; the purpose of each trip on a tour, i.e., service, goods, other, and return to establishment; and, the location of the stops for every trip on a tour. These methods can account for a mixture of vehicles providing service and moving goods as well as empty vehicles returning to the establishment directly. An example of tour-based models is the Calgary model developed for retail and service delivery vehicles (Hunt et. al., 2003).

Supply Chain Models

Supply chain models estimate the logistic chain from distributor to warehouse to retailer to buyer. These logistic chains can then be converted into the number of commercial vehicles required to support the supply of goods from the distributor to the buyer, including any intermediate storage locations. Supply chain models are capable of representing the movement of goods and possibly services, but would not be appropriate to model the movement of people in commercial vehicles. Supply chain models are typically estimated by type of supply chain, such as just in time, inventory, etc., and product. One example of this type of supply chain model is the GoodTrip model developed for the City of Groningen, Netherlands (Boerkamps and Binsbergen, 2000).

Advanced Statewide Models

The Ohio statewide model is one of the few state models in the country that integrates land use, economy, passenger, and freight forecasting models into one modeling system. As depicted in ***Figure 78***, the Ohio model includes two commercial travel demand models: an aggregate, long-distance travel model and a disaggregate, intra-urban travel model.

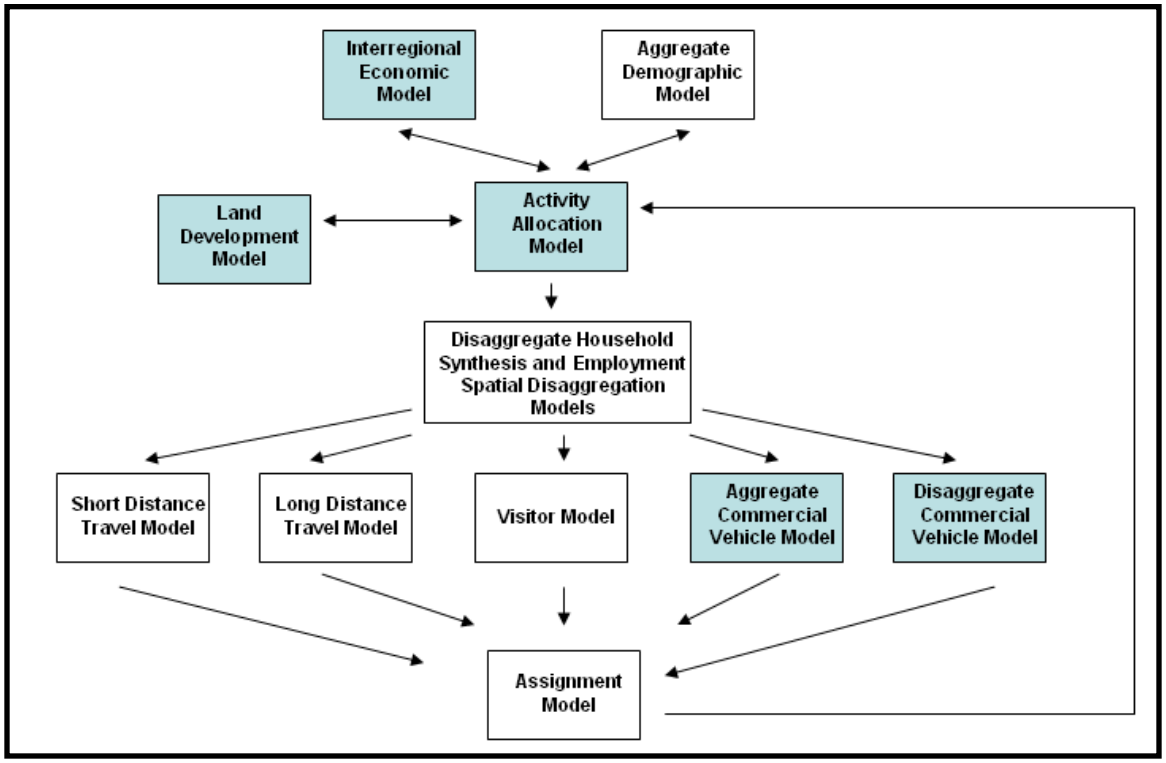


Figure 78: Ohio DOT's statewide travel demand model (Source: Giaimo, 2007)

The aggregate commercial vehicle model forecasts the truck travel throughout Ohio, the rest of the U.S., and Canada. It takes the form of a commodity-based model and converts flows output by the commodity flow model to commercial vehicle flows. The disaggregate model captures the intra-urban commercial vehicle travel related to the delivery of goods, the provision of services, and work-based business travel by employees. The model is a microsimulation model developed from establishment survey data. The models were calibrated using data collected from roadside intercept surveys at the

cordon of each MPO area and a cordon around the entire state. Another primary set of data is auto and truck vehicle counts along roadways within the model area. Other data sources used for model calibration include VMT estimates developed in the HPMS program, intercity air, bus and rail passenger counts, classification counts at permanent count locations throughout the state, and counts by weight class on the Ohio Turnpike (Costinett and Stryker, 2007).

Another example of an integrated statewide model is that for Oregon. In 1996, ODOT embarked upon the Transport and Land Use Model Integration Program (TLUMIP). TLUMIP is intended to develop and refine an interactive statewide economic, land use, and transport model for use in planning and policy analyses at varying scales of geography. The model simulates the economic, land use, and travel behavior relying on a variety of data. The first generation of the model, called Oregon1, has now been successfully applied to several complex policy issues. Using information gained from these initial applications, Oregon2 is significantly refining and expanding elements of the program in a leading edge modeling framework. This framework represents the behavior of the land use, economy, and transport system in the state of Oregon using a set of connected modules that cover different components of the full system, ***Figure 79***.

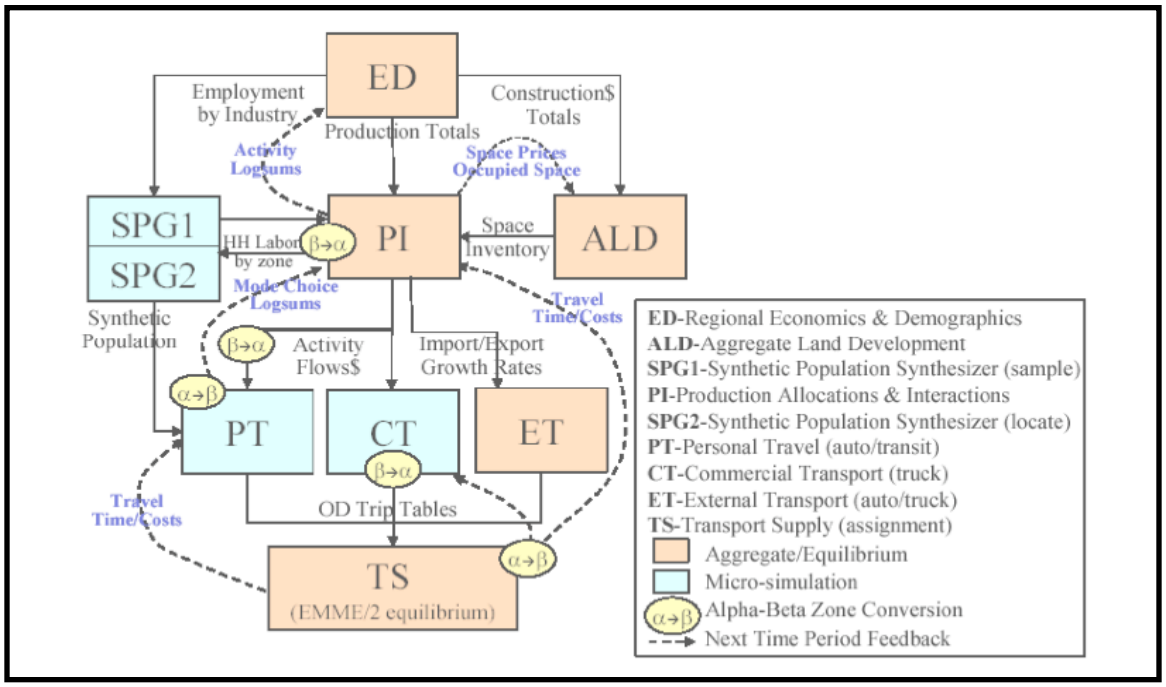


Figure 79: Oregon DOT's TLUMIP (Source: TRB E-Circular No. 75, p. 48)

The commercial transport (CT) module of the Oregon2 model produces the average annual growth estimates for weekday truck traffic volumes. To determine truck traffic growth rates, the module synthesizes a fully disaggregated list of individual truck shipments. For each truck movement, the synthesized data include the type of vehicle (light single unit, heavy single unit, articulated), starting link, ending link, starting time, commodity hauled, and transshipment organization. The module uses truck shipment sizes consistent with the CFS. Activity-based truck tours are generated by the module using activity interaction matrices, which contain aggregate freight flows between activity centers. These flows are first translated into discrete shipments by commodity, and then combined into truck tours. The module also considers empty truck movements, OD distribution patterns, derived from the patterns for loaded vehicles.

Advanced Urban Models

Many variations of the vehicle-based and commodity-based modeling approaches have been developed to implement urban level freight forecast models. Vehicle-based models include Atlanta, Chicago, San Francisco, Buffalo, and Phoenix. Commodity-based models include Portland and Seattle.

One of the more advanced urban freight modeling effort is currently being undertaken by the Los Angeles Metropolitan Transportation Authority (LAMTA). In view of the increased truck and freight activity within its planning region, LAMTA recently initiated a project to develop a comprehensive multimodal regional truck-freight model to supplement its existing passenger travel demand model. As shown in ***Figure 80***, the LAMTA model considers long- and short-haul movements separately. Long-haul freight is derived from commodity flows at a national level that travel within or through the Los Angeles region, modeled with full modal options (truck, rail, and air), and chained with trips through intermodal terminals. Short-haul freight is derived from socioeconomic data in the region and chained with trips through warehouse and distribution centers. Service trucks that do not carry freight are modeled separately and included as part of overall truck movements. Ports are treated as special generators based on forecasts from the ports and data collected at intermodal terminals. The modeling system was also calibrated to reflect the commodity flows derived from CalTrans' ITMS and freight forecasts derived from the FAF.

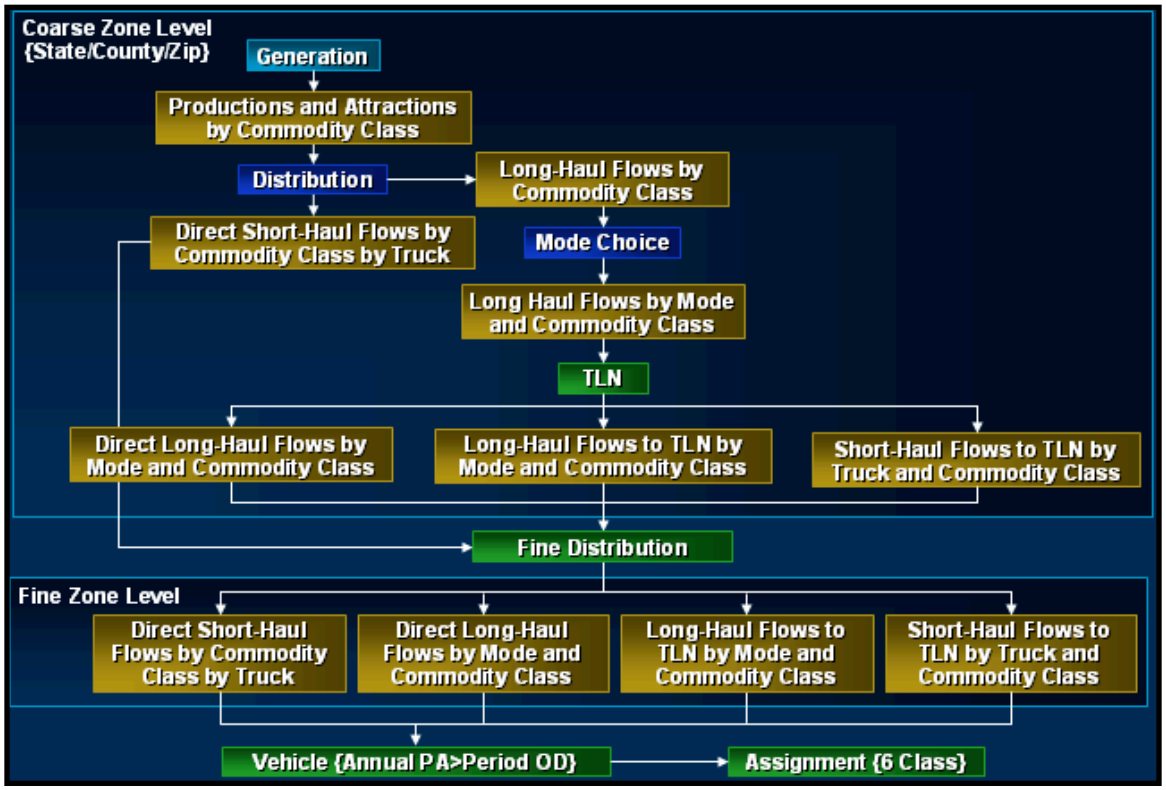


Figure 80: Modeling process adapted in the Los Angeles freight forecasting model (Source: Outwater et. al., 2007)

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